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Research in the Gas Industry

LAST week we discussed the organisation of research in the iron and steel industry with special reference to information published respecting the Brown-Firth Research Laboratories. This week brings under review another kindred industry—gas—with special reference to the laboratories of the Gas Light and Coke Co. On the occasion of the recent annual meeting of the Institution of Gas Engineers, papers were contributed by members of the company who were engaged on research and development work in general, and visits were arranged to the company's laboratories at Fulham.

In the Brown-Firth organisation, it has been pointed out, the ideal is (a) to assist the works on the production side and (b) to assist the consumer on the utilisation side. In the Gas Light and Coke Co.'s organisation (and indeed throughout the gas industry) the consumer and his needs occupies a predominant place. This is natural in a public utility industry that lives by selling directly to the public. Essentially coal gas is produced that it may be burnt in a gas-consuming appliance as is indicated in the slogan: "Mr. Therm burns to serve you." Prominent members of the industry have asserted during the recent institution of Gas Engineers' meeting, that the whole science of gas engineering revolves around the burner of the gas appliance, and that the industry must not be considered as selling a commodity, but a service. The last distinction is fundamental. The public is prepared to find a certain variation in the products that it purchases. Foodstuffs, furniture, tools, seeds, and most other commodities vary from time to time and must be carefully chosen to suit needs and pockets. A service, on the other hand, must always maintain its high quality; it must never fail, and it must be cheap or a competing service, if there be one, will be preferred. The gas industry has many competitors, so that consumer service becomes even more important than in most public utilities.

The research laboratories of the gas industry were established in the first instance to assist gas manufacture, and these laboratories are still an important part of the organisation of the industry. It was found that disturbances in the supply of gas were caused by the deposition of naphthalene and of flocculant rust in the mains and services, so the research organisation was charged with the task of removing this source of consumer irritation. Naphthalene was removed from the gas, when another difficulty immediately presented itself. The naphthalene had prevented the development of sulphur bacteria in gasholder tanks and sulphuretted hydrogen was found to be generated after purification. The research organisation overcame that difficulty. The gas was then dried, but the drying was accompanied by the formation of gummy deposits on gas appliances. This difficulty was also overcome. Continued research has enabled reasonably pure gas to be manufactured and has given the means whereby consumers' appliances may be kept free from obvious trouble. A further step that will be taken ultimately will be the virtual elimination of all sulphur from the gas—another step towards consumer service.

While these developments were in progress, however, it was recognised that direct help should also be given to the consumer, and other laboratories were set up by many large gas companies. Perhaps the largest is that of the Gas Light and Coke Co. at Watson House. Here research is continually in progress to improve the gas appliance, and when an improvement has been effected, the appliance maker is given the pleasant task of putting the improved appliance on the market. At Watson House all materials needed for the distribution and consumption of gas are tested, and, equally important, the apprentices, fitters, salesmen, foremen, and inspectors are trained and refresher courses are conducted for the older men already at work. Most important of all is the industrial research centre. Several large gas companies up and down the country have organisations for the advice of industrial gas consumers. These research departments which exist for no other purpose than consumer service deal with all industrial heating problems. They undertake experiments, collaborate with manufacturers of furnaces, and give general advice on fuel usage to secure the greatest economy in the use of gas. If necessary special furnaces are erected, scrapped if not satisfactory, and others set up until an efficient furnace is obtained. It is now established that the constancy of gas utilisation in any appliance depends upon the calorific value of the gas, the pressure, the specific gravity and the flame velocity. The next step likely to be taken is to develop manufacturing methods whereby the specific gravity and the flame velocity can be standardised under all conditions.

It is evident that the organisation of research within the gas industry is being increasingly devoted to producing a trouble--free gas, to producing appliances that will give the lowest gas consumption per unit of work done, and to assisting industry to make use of gas in place of initially cheaper, but ultimately less satisfactory competing fuels. The research chemist and physicist of the gas industry must be increasingly commercially-minded, and although within the industry there are to be seen examples of academic research methods, they are always directed ultimately to a severely practical end. It is noteworthy that generally manufacturing research and "consumer appliance" research are handled in separate laboratories.

Notes and Comments

Industry and the New Tax

THE new tax on profits has the merit of extreme simplicity and on that account it made a good impression in business circles. What it amounts to is an additional income tax of 1s. in the £ on trade and industry, which will be called upon for the next five years to pay 6s. in the £ in direct taxation. Relief is provided for small businesses and exemption for public utility undertakings, which are subject to statutory restrictions. Less easily understandable is the exclusion of the professions from the tax. This, and other controversial features, will have to be thrashed out when the House of Commons comes to debate the details of the Treasury's second thoughts. While it is true that British trade and industry as a whole is prepared to shoulder a heavier burden than was ever before imposed upon it in peace time, it does not follow that there is any feeling but one of anxiety about the colossal expenditure to which the Government stands committed in the present Budget. Granted that the rearmament programme is a national necessity, the business world would be better pleased if the new millions to be raised on that account were to be balanced by economies in other directions. But of economy there is not the slightest hint in the present financial policy of the Government.

A Suggested Public Works

WHILST upon the subject of public expenditure, reference may be made to the letter of Dr. Blacktin in THE CHEMICAL AGE last week. Having in mind our own insistence on the need for sulphur elimination in addition to smoke prevention if purification of the atmosphere is to be achieved, Dr. Blacktin suggested " smoke mains " which should remove all products of combustion " in every city and area " and convey them to places where the smoke and sulphurous gases would do no harm, or might even be needed to produce a smoke screen against air attack. Dr. Blacktin concludes that " this should not be a very difficult chemical engineering feat." The difficulty, of course, is not in the engineering side, but in regard to the cost. In a Martian world as depicted by Mr. H. G. Wells, the community had to perform prodigies of engineering to save itself from extinction. Assuming that we have interpreted Dr. Blacktin's proposal aright, has he calculated the cost of (a) making all combustion stoves and flues air-tight so that the smoke mains should not be burdened with huge quantities of indrawn air; (b) of making and laying the mains throughout the country; and (c) of pumping the smoke gases under pressure (for they would not flow without impelled force) from the towns to the country or sea? It is admittedly a scheme for consideration for action in time of trade depression, but that is all the more reason why it should be debated now. Perhaps Dr. Blacktin will favour us with a more detailed scheme. Meanwhile, it is germane to point out that there exists another and much simpler way of achieving the same object. The most modern electric power stations are taking both sulphur and solid matter out of their exhaust gases. The gas industry (if necessary by total gasification) can wholly provide fuel that yields waste gases free from sulphur and smoke. If these fuels were generally used, instead of only to the extent of about 10 to 15 per cent. of our fuel requirements, they could be sold very much cheaper than to-day. We suggest that the Government should set up a commission to investigate this suggestion as one to be put into operation during the next depression.

Prevention of Trade Slumps

IN the issues of THE CHEMICAL AGE for April 3 and April 10, 1937, attention was directed to the need for taking preventive measures against the periods of alternate boom and depression that are the breeding ground for socialism and bankruptcy, and that bear so heavily both upon the well-being of productive industry and upon the health of all who must needs earn their livelihood by the sweat of their brows. Attention had been previously directed to this pressing problem by Mr. J. R. Keynes, and a renewed attempt to persuade those in danger of drowning to learn to swim has lately been made by a number of eminent economists of Oxford who have collectively addressed a letter to " The Times " upon the subject. Curiously enough, these gentlemen do not appear to have read what has been written before upon this subject, for they make the identical suggestion that was previously made by Mr. Keynes, namely, that action should be taken by public authorities. It is specifically stated that industrialists should make themselves responsible for measures to regularise employment and that there are other measures that might be considered, but primarily, these economists hold that the forces of a depression may—in part at least—be counteracted if the State, the local authorities, and other public bodies increase their expenditure on works of capital development as the slump begins. This helps to maintain activity in the occupations and trades providing capital goods and to break the vicious circle whereby a fall in incomes earned in such trades causes a fall of expenditure on consumption goods and so a general depression. The difficulty of improvising schemes that shall be of any value, leads naturally to the view that public works expenditure should be carefully planned in advance. At this juncture such expenditure should be avoided, but now is the time to plan ahead.

Anglo-American Trade

THE negotiations which are proceeding between London and Washington are the most hopeful signal that has appeared on the international horizon since the spectre of economic nationalism descended upon the world. The official negotiators know just as well as their critics that it would be easier to get a trade agreement with the United States if there were no Imperial Preference Duties. The acceptance of these duties by successive British Governments does not rule out trade agreements with good customers, wherever they may be found, and Mr. Stanley, the new President of the Board of Trade, very properly insisted that there was no antipathy between the principle of Imperial Preference and the possibility of an agreement with America. The over-riding need of British commerce is a great expansion of oversea trade, and it seems most unwise to strengthen the impression that London is less anxious for an agreement than Washington.

Chemical Engineering in Germany

Notable Exhibits at the Forthcoming Achema VIII

ACHEMA VIII, the German chemical engineering exhibition which is organised at three year intervals, will be held at Frankfort-on-Main, July 2-11, on the occasion of the National Congress of German Chemists and the 50th general meeting of the Verein Deutscher Chemiker (Association of German Chemists). Nearly all the leading German firms manufacturing chemical plant, machinery and apparatus will be represented, and will show their latest developments. Some firms will demonstrate the original apparatus or machinery and will exhibit full-sized plants in operation, whereas other firms will show working models and drawings or plans of the plant and equipment they build. It is anticipated that Achema VIII will be the greatest exhibition in the field of chemical engineering which has ever been held, as seven halls with a total floor space of about 285,000 sq. ft. have been found necessary to house the vast amount of material which is to be exhibited.

Measuring and Regulating Devices

Technical measuring and regulating form the basis of an economic exploitation of manufacturing processes. The equipment which industry has at its disposal to attain this object has been developed to a high degree of sensitivity and exactitude. Exhibits in this direction will offer the factory manager and engineer an unique opportunity to make a comprehensive survey of recent achievements in the field of technical measuring, controlling and regulating apparatus and devices of all kinds. In particular small and medium-sized firms in the chemical industries will find a variety of new machines and equipment suitable for a great number of purposes where large size apparatus cannot economically be employed. Apart from pumps equipped with stuffing boxes, there will be shown a number of recent designs of pumps without stuffing boxes where the problem of packing has been solved by novel methods.

Appliances and accessories for general factory use in the field of chemical engineering, such as fittings, pipes, machines and appliances for industrial heat and power production, air conditioning and ventilation plants, workshop and laboratory equipment, etc., will be more than adequately represented, and factory managers will have ample opportunity to inform themselves about the new designs which have been developed in this field. Progress in the production of chemical stoneware will form another notable feature. Visitors will be shown a number of new kinds of stoneware with improved qualities adapted to special purposes. These new kinds of stoneware have increased density, higher coefficient of heat conductivity, increased resistance against changes of temperature, etc., and therefore open to stoneware a number of new applications which the visitor can study in practical examples. Of special interest are the new types of stoneware machinery, mainly represented by pumps and fans.

Protection Against Hazards

The protection of workers against danger and the safeguarding of the workshop will be an important feature of Achema VIII. Aside from an extensive "Special Show of the Mutual Accident Insurance Society of the Chemical Industry" (Sonderschau der Berufsgenossenschaft der Chemischen Industrie) various firms active in this field will demonstrate modern appliances for protection against dust, gas, explosion and fire.

Optical processes and methods have always been a valuable aid to the chemist in the laboratory and on the plant. Innumerable new models of microscopes, spectroscopic instruments for analytical purposes, refractometers, etc., bear evidence of the rapid development in this field. For the first time there will be shown at the Achema VIII a special exhibit of photo-electric cells which will instruct the visitor about the many applications for these devices in the field of measuring and regulating. In the field of laboratory equipment will be shown glass apparatus, mechanical, optical and electrical instruments.

Non-corrosive and acid resistant steels will be exhibited in great variety by the German steel industry. Of particular value to the visitor appear to be all those weldable non-corrosive steels and those nickel-free chromium steels, which can be welded and which do not require annealing afterwards. The growing importance of these steels need not be specially emphasised.

Among the many new types of dryer constructions are plate type dryers, shelf-dryers, band dryers, and spray dryers. Mixing, agitating and kneading are processes which occur in practically all branches of chemical engineering. Achema VIII will therefore give the visitor an opportunity to see the important progress in this field and to acquaint himself with the advantages which can be obtained by utilising the latest economic improvements.

"Achema" Courses of Study

Large scale technical apparatus and plant, considered apart, will be shown in exhibition halls having a floor space of 130,000 sq. ft. Here the visitor will witness a splendid example of planned co-operation between chemist and engineer and the successful application of the ideas developed in the laboratory in large scale manufacture. Ovens, kilns and furnaces for laboratories and factories will be represented in various dimensions and types, some of which permit the obtaining of temperatures above 2,000° C.

Achema courses of study are being organised again, with the object of giving the rising generation of young chemists and engineers an opportunity to acquaint themselves with the latest achievements in the field of chemical technology from the view point of the plant and apparatus designer. This aim will be reached by a course of study, lasting several days, of the objects exhibited in connection with special lectures.

Plant for Plastics Manufacture

Use of Nickel and Nickel-Clad Steel

THERE is no doubt that there is a vast future field for plastics, and the number of applications for which they will prove suitable may soon become comparable with the many thousands of applications for which a great number of modern alloys has been created. In some cases plastics may displace metals, but in the case of nickel a wider production of plastics is likely to lead to an increase in the consumption of that metal.

The purity of plastic materials is of primary importance. Many metals have a harmful effect on the properties and colour of the finished products, or tend to interfere with the desired chemical reactions. Nickel, however, has been found to be a most suitable metal for plastic handling plant, and in the form of the solid metal or as nickel-clad steel plate, it is readily fabricated into the necessary equipment. Pure nickel is used for storage tanks for phenol and other raw materials, condenser and coil work, agitators, pumps, valves and other equipment in contact with corrosive ingredients. The strength of the metal is an important factor, particularly in the construction of jacketed pressure vessels. In the case of large equipment where it is desired to employ the properties of nickel in an economical manner, nickel-clad steel is preferably used for the construction of large mixing and storage tanks.

Society of Chemical Industry

Forthcoming Annual Meeting at Harrogate

QUESTIONS ranging from the problems of alloy cast irons to the utilisation of waste fruit will be discussed at the 56th annual meeting of the Society of Chemical Industry, which will be held at Harrogate, July 5 to 9. It is expected that more than 500 scientists will be attending the meeting. The presidential address will be delivered by Lord Leverhulme.

Mr. A. Charley, of the Long Ashton Research Station, near Bristol, who has recently carried out pioneer research on the use of surplus fruit to make wines, spirits and liqueurs, will open a symposium on fruit juices. His work represents one more example of the successful application of scientific methods to what was once a traditional craft. He will be followed by Mr. T. N. Morris, of the Low Temperature Research Station, Cambridge, who is concerned with the concentration of juices by freezing; Mr. J. Arthur Reavell will speak from the point of view of the chemical engineer. Dr. A. B. Everest, who will give information on the special properties of the new class of alloy cast irons as material for chemical plant, is one of the experts in the forefront of this development.

An attractive programme of excursions has been arranged to cover such varied industries as cocoa and chocolate manufacture, oil and cake mills, clothing manufacture, and the making of solid drawn metal tubes. A visit has also been arranged to the Board of Greenkeeping Research at Bingley, the research station of the British Golf Unions Advisory Council. A comprehensive series of experiments will be shown dealing, among other subjects, with the effects of worms, weeds and fertilisers.

Members attending the meeting will be able to visit Wharfedale and Nidderdale; in addition, special facilities are being provided by Harrogate Corporation. There will be a reception and dance at the Royal Hall, Harrogate, on July 6, by invitation of the Mayor and Corporation.

Canadian Chemical Industries

Increased Production for 1936

PRODUCTION of chemicals and allied products in Canada during 1936 was valued at $125,702,725, an increase of 6 per cent. as compared with the total for 1935. In only one year has the 1936 figure been exceeded, namely, in 1929, when the record total of $138,545,281 was reached; it should be recalled, however, that the general price level for chemicals and allied products is now about 18 per cent. lower than in 1929. The 1936 volume was therefore greater than in any other year on record.

The improvement last year was general throughout the industry, as thirteen of the groups reported substantial advances, one only reporting a very small decline. The gains were as follows: Coal tar distillation, 12.9 per cent. to $2,942,955; compressed gases, 7.7 per cent. to $3,315,793; fertilisers, 13.9 per cent. to $6,923,364; medicinals, 4.9 per cent. to $22,356,888; paints, 8.8 per cent. to $22,144,522; soaps, 1.9 per cent. to $16,312,876; toilet preparations, 1.1 per cent. to $6,085,900; inks, 6.2 per cent. to $3,066,923; wood distillation, 6.5 per cent. to 858,147; adhesives, 24.1 per cent. to $1,783,391; explosives, 9.5 per cent. to $9,354,351; and miscellaneous, 11.3 per cent. to $9,251,376. The aids, alkalies and salts industry, or the heavy chemical industry, showed a very small decline from 1935, the value of output being $18,926,291 as against $19,012,615 in the previous year.

In the whole group there were 743 factories in operation in 1936, involving a capital of $149,135,904 and employing 19,700 workers. A total of $51,614,590 was spent on raw materials, $25,210,970 for salaries and wages, and approximately $4,300,000 for fuel and electricity. The increase in the average number of employees as compared with 1935 was 4.4 per cent.

Canada's imports of chemicals and allied products during 1936 were valued at $31,971,047 or $2.2 millions more than in 1935. Purchases from United States at $18,531,817 made up 57.9 per cent. of the total, and shipments from the United Kingdom at $6,802,014 accounted for 21.3 per cent. Exports increased in value to $17,749,628 from $16,372,476 in 1935. About 43.7 per cent. of the exports, valued at $7,763,681, went to the United States; 21.7 per cent., valued at $3,858,025, to the United Kingdom.

Colour Blender's Compensation

Unsatisfactory Medical Evidence

A CANNING TOWN man was the applicant in a Workman's Compensation Act claim in the Bow County Court, on June 9, when Judge Konstam said that the evidence of the London Hospital doctor was very unsatisfactory. The applicant was James Stanley Norton, a colour blender, of 63 Liverpool Road, Canning Town, and the respondents were Jenson and Nicholson, Ltd., of Goswell Works, Warton Road, Stratford, paint, varnish and colour manufacturers.

The applicant had been employed by the respondents as a colour blender for some time, but in the March of 1935 he was certified as suffering from lead poisoning. He was earning £2 12s. a week, and was paid compensation at the rate of 24s. 3d. a week, up to September 21, 1936, when the respondents gave notice of discontinuance on the ground that the applicant had recovered. In April of this year he was certified by the medical referee, Dr. Kenneth Goadby, as fully recovered, and capable of carrying on any sort of work. The applicant had done no work since, and now brought a claim for compensation from the date that it was ceased, on the ground that he was still suffering.

Mr. Edgedale, who appeared as counsel for the respondents, said the certifying doctor's certificate was binding, and there was no appeal for the man as to anything that had occurred after that date, but he did not know what his Honour might think as to the time between the September and the April.

The applicant, who appeared in person, said he had had a doctor, but he could not afford to bring him as he had no money. He was still feeling the after effects of the lead poisoning. He could not sign on the Labour Exchange as he could not do light work.

After Effects of Lead Poisoning

For the respondents, Dr. Kelly was called and said that the applicant came to the London Hospital and said he was suffering from the after effects of lead poisoning. They put him under treatment for five and a half weeks, and could find nothing the matter with him. He said he had abdominal pains, but they could find no trace of them, and concluded he was neurasthenic, and did not require further treatment. Whatever was the matter with him was functional. They had him in hospital a long time as it took a long time to be sure whether or no a man was suffering from lead poisoning or no.

Judge Konstam pointed out that the medical evidence was very unsatisfactory. The doctor had said there was nothing the matter with the applicant, but that he was suffering from neurasthenia, a contradiction in terms; applicant did not require further treatment because what he was suffering from was functional, another contradiction.

Dr. Kelly: We came to the conclusion he was malingering.

Judge Konstam said he was by no means satisfied as to the evidence of the doctor, and would give the man the benefit of the doubt. He would award him compensation from September 21, 1936, to April 27, 1937, at £1 a week, and would allow the applicant his costs.

THE Australian production of iron-pyrites, which is already well-developed, is expected to be further augmented by the operations of the £1,000,000 Lake George Mining Corporation, Ltd., which has been formed in London to exploit a large mining lease near Sydney.

Recovery of Iodine from Waste Iodide Solutions*

By C. C. De WITT, Michigan College of Mining and Technology

DIRECTIONS have appeared from time to time regarding the recovery of iodine from the waste iodide solutions which accumulate about the laboratory. Although the chemistry of these methods is well known, the technique here described may be of value because it is simple and almost quantitative in character.

The waste iodide solutions are usually quite acid and often contain ammonium bifluoride, used in determining copper in the presence of iron by the iodide method, which, even in dilute solutions, etches glass containers deeply over a period of several months. Therefore, great care must be exercised in handling such containers. The waste iodide solutions are decanted or filtered from any precipitated iodides. The addition of a Filter-Cel suspension to the solution permits rapid filtration. The precipitated solids are saved for further treatment. The filtrates containing the soluble iodides are placed in a large container; a small portion of the solution is reserved for later use. The iodine is recovered as follows.

Removal of Bulk of Iodine

Precipitate the iodine in the acidified waste iodide solution by passing in chlorine gas until there is a slight excess of chlorine present. The course of the reaction may be followed by pipetting off some of the liquid and observing whether iodine is precipitated by the addition of clear dilute potassium iodide solution. Then add enough of the reserved iodide solution to use up the excess chlorine and leave a slight excess of iodide. This point is readily recognised by a slight deepening of the colour of the solution caused by the dissolving of some of the precipitated iodine. Filter on a Büchner funnel, using an ordinary filter paper previously covered with Filter-Cel laid on by filtering a Filter-Cel suspension. The filtration process is greatly facilitated by the addition of about five grams of Filter-Cel for each litre of solution. Keep the solution well stirred while filtering. Wash the iodine and accompanying filter medium at least six times, preferably more, with distilled water. In the washing process care should be taken that the surface of the iodine is not unduly exposed to atmospheric oxidation between washings, or thereafter. After washing submerge the filter paper and the precipitate in distilled water immediately. Combine washings with filtrate.

Testing for Quantity of Iodine Remaining

In order to determine the exact amount of chlorine water necessary to release the combined iodine as iodide in the filtrate and washings a comparative scheme of analysis is used. This method involves the titration of the free iodine initially present with a solution of sodium thiosulphate of unknown strength. Then on a separate sample all of the iodine, free or combined as iodide, is converted to iodine monochloride by the agency of strong hydrochloric acid and potassium iodate. The iodine monochloride so formed is allowed to react with potassium iodide, whereby both the iodine present as monochloride and an equivalent amount of iodine from the potassium iodide is liberated. This released iodine, after adjustment of the acidity of the solution, is then titrated with the thiosulphate solution previously mentioned.

A solution of KIO_3 containing about two grams per liter, and a solution of $Na_2S_2O_3$ containing about five grams per litre are prepared. The exact strength of these solutions is unimportant. Pipet 10 to 25 cc. of the dilute iodine-iodide solution into a glass-stoppered bottle or flask. Add 5 cc. of concentrated HCl and five cubic centimeters of chloroform. Run in KIO_3 solution, shaking thoroughly after each addition, until the chloroform is just decolorised. The reactions involved are :—

$$KIO_3 + 2KI + 6HCl = 3KCl + 3ICl + 3H_2O \quad (1)$$

$$KIO_3 + 2I_2 + 6HCl = KCl + 5ICl + 3H_2O \quad (2)$$

Add to the contents of the flask one gram of KI; after this is in solution and thorouhly mixed with the contents of the flask, add five grams of sodium acetate dissolved in 30 cc. of water, and titrate the liberated iodine with $Na_2S_2O_3$ solution until, after thorough shaking, the iodine colour just disappears from the chloroform. Here the reactions involved are :—

$$ICl + KI = KCl + I_2 \quad (3)$$

$$I_2 + 2Na_2S_2O_3 = 2NaI + 2Na_2S_4O_6 \quad (4)$$

The total iodine in the solution is then expressed by one-half the total number of cubic centimeters of $Na_2S_2O_3$ solution used.

Now titrate a 10- to 25-cc. portion of the dilute iodine-iodide solution with $Na_2S_2O_3$ solution, using starch solution as indicator. Let x cc. of $Na_2S_2O_3$ be the equivalent of the free iodine in the original solution, and y cc. of $Na_2S_2O_3$ be the equivalent of iodine as KI in the original solution. Then from the equations the following relationship holds :—

$$\frac{5}{4}x + \frac{3}{2}y = \frac{1}{2} \text{ cc. } Na_2S_2O_3 \text{ used in (4)}$$

Since x is determined by titration of the free iodine in the original solution, y may be easily evaluated.

Prepare a large volume of saturated chlorine water—enough to effectively displace all the iodine in combination in the residual solution. Pipet a 10- to 25-cc. portion into an excess of KI solution. Titrate the released iodine with the $Na_2S_2O_3$ solution.

Calculations Involved

Now mix the proper volume of chlorine water and iodide solutions. For example, suppose the iodine released by the ICl required 41.2 cc. of $Na_2S_2O_3$ solution. The free iodine in the original solution required 2.4 cc. $Na_2S_2O_3$ solution. The free iodine in the original solution required 2.4 cc. $Na_2S_2O_3$ solution. Then,

$$\frac{5}{4} \times 2.4 + \frac{3}{2}y = \frac{1}{2}(41.2)$$

or $y = 11.73$ cc. If the iodine released by the same volume of chlorine water requires 15.6 cc., then 11.73 cc. of chlorine water will displace the iodide iodine in 15.6 cc. of the original solution. Any oxidising substance whose iodine displacement value can be measured in terms of the $Na_2S_2O_3$ solution may be used in place of chlorine water for this part of the recovery.

When the iodide-iodine solutions are thoroughly mixed with the proper amount of chlorine water, the resultant solution is filtered on a Büchner funnel as before, and the filtrate is treated with about five grams of activated charcoal per litre of solution or enough to remove by adsorption all the dissolved free iodine. The charcoal is then filtered on a Büchner funnel and washed well with distilled water. The charcoal and filter paper are placed in a distilling flash and enough distilled water is added to form a suspension; then a condenser is affixed and the suspension subjected to steam distillation, using auxiliary eternal heating to avoid excessive condensation in the flask, until all the iodine is driven off and condensed. The water distilled over with the iodine is again treated with a little activated charcoal to remove its iodine content and the process repeated. The final iodine solution so obtained is returned to the waste iodide container. The final filtrate may contain traces of iodine as iodide, or a very slight excess of chlorine water. The recovery of these small amounts of iodine may be accomplished by repeating the above procedure.

The insoluble iodides filtered from the original solutions are treated as follows. Dissolve the precipitate in an excess of aqua regia and evaporate to dryness on a steam bath. Take up with 1 : 1 HCl and evaporate to a small bulk to remove nitric acid. Dilute and precipitate the heavy metals

* Reprinted from "Journal of Chemical Education," May, 1937.

as sulphides with hydrogen sulphide. Filter, wash well with water, and return the filtrate to the waste iodide container for further treatment.

The conversion of the recovered iodine to potassium iodide is accomplished by combining all the filtered, thoroughly-washed iodine precipitates and suspending them in distilled water. For every 500 g. of precipitate, use about two litres of water. Pass water-washed hydrogen sulphide into this suspension until the colour of the iodine disappears. Boil the solution to agglomerate the colloidal sulphur and then cool. Add at least 20 g. of activated charcoal for each 500 g. of precipitate and boil again for a few minutes. Filter on a Büchner funnel and wash well with distilled water. Exactly neutralise the clear filtrate with potassium hydroxide or potassium carbonate† and evaporate to incipient crystallisation, cool, and collect the crystals. Repeat the evaporation and collection of crystals until but a small amount of mother liquor remains. Return this mother liquor to the waste iodide container.

Sodium iodide is obtained by a similar procedure; in this case the dilute hydriodic acid solution is exactly neutralised with either sodium hydroxide or sodium carbonate.

Should the original waste solutions contain iodine as sodium iodide, no variation in the indicated procedure is necessary. However, if the iodine is present as an oxy-compound, KIO, KIO_3, KIO_4, it is necessary, according to the present recovery scheme, to convert the iodine in these compounds to the free state or to the iodide. This may be readily accomplished by passing sulphur dioxide into the filtered, acidified waste solutions until the colour of iodine just disappears from the solution. The solution may then be treated for the removal of iodine in the manner already described.

The amount of sulphur dioxide used may be materially reduced, if, during the reduction process, the iodine is filtered off from time to time. The final dilute oxyiodine solution is then completely reduced and subjected to the treatment with chlorine as indicated.

Purification of the Iodine

Steam distillation supplemented by auxiliary external heating offers the simplest and most convenient solution to the problem of separating the iodine from the Filter-Cel-filter-paper precipitate obtained by the present recovery method. The use of glass flasks and large diameter condenser tubes is advised; provision should be made for removing the iodine accumulating in the condenser. The iodine is filtered from the condensed water, quickly transferred to a container and dried at room temperature in a dessicator containing concentrated sulphuric acid or other appropriate drying agents.

After drying, the iodine may be sublimed. An all-glass retort, the body of which is almost totally submerged in an oil bath held at about 110°, is satisfactory. The iodine vapour is condensed in a water-cooled three litre round-bottomed flask.

New Knowledge on Wood Preservatives

A Forest Products Research Publication

THE limitations applying to the use of wood preservatives are set out in a small publication which has just been issued by the Department of Scientific and Industrial Research (Forest Products Research Record No. 17, Stationery Office, 6d.).

Dealing with patented and proprietary preservatives which are sold in small containers for the benefit of the ordinary householder or small builder, the report says that, generally speaking, preservatives manufactured by reputable firms are quite efficient and can safely be used. At the same time the report gives a warning against extravagant claims sometimes made for such preservatives without due regard being given to the comparatively small protection afforded the timber by the skin-deep treatment which results from merely brushing the preservative on the surface. No matter how toxic the solution may be, such penetration gives only limited protection. Dealing with the treatment of timbers which are likely to come into contact with food, the report says that all chemicals that are satisfactory wood preservatives are sufficiently poisonous to make it undesirable that they should have direct contact with foodstuffs, and the only safe way of dealing with the problem is to employ methods of construction which allow the timber the maximum amount of ventilation so that the risk of decay is reduced as much as possible.

Wood Destroying Fungi

If wood is thoroughly wet or thoroughly dry the fungi which are the main cause of decay cannot develop. In most cases, however, where timber is used it cannot be maintained continuously in either of these conditions and decay is only a matter of time unless the timber is properly impregnated with chemicals poisonous to the wood-destroying fungi. These chemicals fall into three classes: oil type preservatives, preservatives soluble in water and those which while insoluble in water dissolve in volatile oil or spirits. All wood preservatives, according to this report, possess certain disadvantages, but no single preservative is ideal; most of them have properties or advantages which make them suitable for certain purposes.

Coal-tar creosote, a black or brownish oil, obtained by distilling tar from gas works or coke-ovens, is the most important oil type preservative; a British Standard Specification, which was revised last year, exists for it. It is comparatively cheap and very toxic to the fungi, but its disadvantages are its smell, which passes off with time, and the fact that creosoted wood cannot yet be painted satisfactorily.

Characteristics of Creosote

The variation in colour of creosote is frequently the cause of a certain amount of embarrassment to creosoting firms and users alike. "Creosote from tar stills," the report states, "is usually a light brown colour and wood treated with this oil is only slightly darkened. The psychological effect of this is that the purchaser imagines that he is not having his timber treated with a genuine product. With use the creosote darkens in colour and the treated wood becomes correspondingly blacker. Objections to lightness of colour are generally overcome by the addition of tar to the creosote to darken it. A clean, light surface is frequently desirable, but as a result of the general demand for a black creosote it is difficult in practice to obtain creosoted wood of a light colour. If the false idea that a good creosote must of necessity be black in colour could be dispelled it would be to the general good. A clean creosote penetrates the wood much better than a dirty one, and the black creosotes are invariably dirty. If the creosote conforms to the requirements of the British Standard Specification it can be taken for granted that the oil is a satisfactory wood preservative, whatever its colour."

Contrary to the view that has been expressed from time to time, creosote does not water-proof timber to any extent. Actually petroleum oil has better moisture-proofing properties, but since it has little or no toxicity this oil when used alone affords little protection to the timber.

Dealing with the water soluble type of preservatives, the report states that these are cheaper as a rule than the oil types. Since they can be supplied in concentrated form they are easier to transport, and the majority involve very little fire risk. They are also generally odourless and the treated

wood, after drying, can usually be satisfactorily painted with ordinary oil paints. On the other hand, since they are water soluble, they are more easily dissolved out of the wood when it contacts with the ground.

Zinc chloride is the most extensively used preservative of this type and can be satisfactorily used for the timbers in factories where manufacturing processes are carried out under conditions of high humidity, such as in cotton mills. Mines provide another example of situations in which it is eminently suitable. Zinc choride solutions have a slight corrosive action on iron and steel. Sodium fluoride is another popular water-soluble preservative and forms the basis of several proprietary preservatives of continental origin. It also has no serious corrosive properties. Magnesium silicofluoride is another substance very toxic to fungi and is frequently recommended as a preservative against dry rot. This salt attacks metals and glass and should not be used in contact with them and the treating solution, which is generally applied by brush, should be made up in a wood container. Copper sulphate also attacks iron and has a comparatively low permanency on account of its high solubility.

Recent research has been applied to making water-soluble preservatives more permanent. It appears, for example, that the addition of dichromates of potassium and sodium are able to fix the salt in the wood to a remarkable extent.

Solvent type preservatives consist of a toxic chemical dissolved in a volatile oil or spirit solvent, which, after treatment, evaporates and leaves the dissolved toxic chemical in the wood. On the whole these preservatives, especially those containing solvent naphtha, penetrate the wood slightly better than other types, and are thus more suitable for surface treatmore than five years of operation.

Monel filter and screen cloth is available in practically every weave and mesh and is used extensively in light oil plants for the flame arrester screens on breather vents of light oil tanks, and for straining residual oil. From one plant, in which 200 mesh Monel screens are used in the vents of the oil tanks, it is reported replacements are never required.

Light Oil Refining

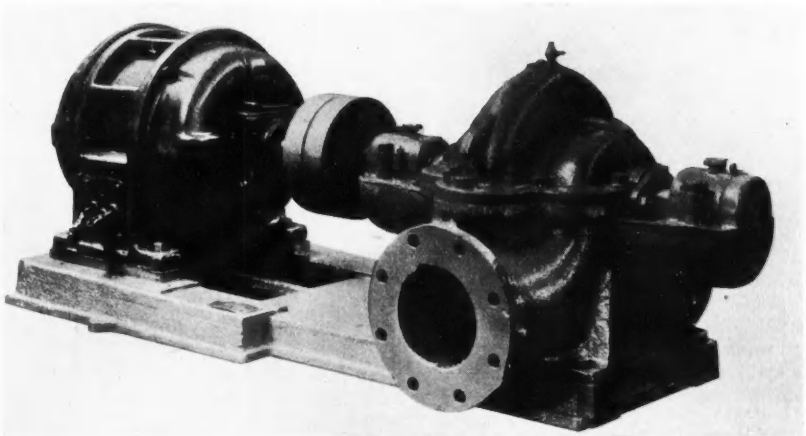
Preferred Use of Monel Metal

THE earliest use of Monel Metal in equipment for washing light oil with sulphuric acid and caustic was reported in 1926. According to correspondence which is quoted in the current issue of " Monel Notes " the 1926 user wrote " the second step in the refining of light oils is known as acid washing and is performed in a 4,500 gallon vertical agitator 9 ft. in diameter with a cast iron hopper bottom equipped with water cooling coils and Monel shaft and propeller mounted in a cast iron central pipe and driven by a vertical type induction motor. Concentrated 66° Bé sulphuric acid is fed from a gravity measuring tank into the agitator while the Monel propeller is running. The acid is admitted in portions of 1 per cent of the charge of light oil and the total quantity used is from 3 per cent. to 5 per cent."

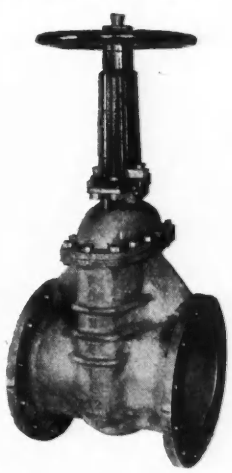
Monel metal shafts and propellers are in use to date in this and other agitators at this plant. It was found that the Monel shafts give from 5 to 6 years' service and that the Monel propellers have a life of about 2 years. Money is employed also for the rods, brackets, bolts and nuts holding the centre tube : it has been used for these purposes for eight years in one agitator in the by-product coke plant of a steel mill. Drain valves handling the acid sludge have also been made in Monel.

Because of the excellent performance of Monel metal in these applications, one plant recently lined the conical bottom of an agitator with Monel sheets 0.109 in. thick. The lining was put in place and joined by welding without removing the equipment from the plant. Such work may be done readily with Monel, as the alloy can be easily welded by the usual processes and a subsequent heat-treatment is unnecessary. In this particular agitator light oils are treated with sulphuric acid of either 93 per cent. or 45 per cent. concentration when admitted. The washed oil is subsequently treated with a caustic soda solution of 20 per cent. to 25 per cent. concentration. The lead linings previously gave three years' service under these conditions. Failure was due to creep of the lead and corrosion at the bottom of the cone. The inability of lead to withstand erosion and attack by caustic solutions is well known, and it seems reasonable to assume that these factors had a decided bearing on the relatively short service obtained.

In some localities, where bad water conditions prevail, corrosion of benzol dephlegmator tubes from the water side has caused much difficulty. Seamless Monel tubes (2 in. outside diameter and 0.083 in. wall) have been used to retube such dephlegmators. An inspection after 2 years of use revealed no sign of corrosion, and the tubes are still in service after ment of the timber by brush or spray.



An " all Monel " Centrifugal Pump employed by a large oil company for handling sulphuric acid solutions.



Monel Gate Valves are used for 12 inch acid sludge pipe lines.

A New Way of Making Gas Non-Poisonous

The Boscoseur-Marishka Process

A NEW process for making gas free from carbon monoxide as described by Dr. Oskar Zahn, in "Chemiker Zeitung," April 7, 1937, page 298. Such a process, states the author, should reduce the carbon monoxide to 1 per cent. maximum; (2) make no increase in the carbon dioxide content; (3) allow the use of a contact material which is cheap and of which the activity can be regenerated; and (4) demand but little heat consumption, steam requirements for the conversion of the carbon monoxide being covered by the exothermic effect and otherwise waste heat as far as possible. These conditions are said to be fulfilled by the new process which is known as the Boscoseur-Marishka method of freeing gases of carbon monoxide, and in which the conversion of the carbon monoxide to carbon dioxide and the removal of the latter by absorption are accomplished simultaneously and without impairing the heat value of the gas under treatment.

Experiments by W. J. Müller and E. Grat with this process are described in "Gas u. Wasserfach," 1934, page 77, and 1936, page 14. Considerable changes in the specific gravity and ignitibility of the gas have no unfavourable action on the combustion of the treated gas, and no change in the combustion apparatus is required. The heating value of the gas after treatment by the process is increased somewhat by the increase in the hydrogen proportion.

Conversion of Carbon Monoxide

The conversion of the carbon monoxide to carbon dioxide in the process is made by steam in the presence of a catalyst, according to the equation $CO + H_2O = CO_2 + H_2$ but differs from other processes employing this reaction in that the carbon dioxide is absorbed as formed by the contact material in the same space as the conversion. The catalyst is freed from absorbed carbon dioxide and regenerated into the active condition in a regenerator furnace, heated by using the cheapest available local fuel, and is cooled down sufficiently to again take over the double function of catalyst and absorbent; the action of the process is, therefore, of a-cyclic character. As a natural contact material, the mineral ankerite is suitable; this mineral contains iron, lime and magnesia in the form of carbonates. Either the natural mineral, or a mixture artificially produced from the same, can be used. Besides the double action mentioned, this contact material also absorbs organic sulphur compounds in the gas, and thus eliminates the necessity of a special treatment for the removal of these and hydrogen sulphide.

The greater part of the conversion of the carbon monoxide takes place in a single treatment of the gas as described, but if complete conversion, or a 99 per cent. and upwards conversion is desired, the gases are passed through a side contact furnace to reduce the carbon monoxide content down to 1 per cent. as a maximum. Whether or not the last traces of carbon monoxide are removed or not depends upon the local requirements in this respect. In this side contact furnace, it is necessary to regenerate the contact material only at long intervals.

Utilising the Sensible Heat

After utilising the sensible heat in the treated gas to produce saturated steam and hot water, the gases are conducted in a final cooler and their temperature reduced to about 20° C. The steam leaving the contact furnace at 12—15 atmospheres pressure, is used to drive a turbine which is employed to produce electric energy; the excess exorthermic and other unutilised heat in the process can be used to produce steam, or in any other way desired.

The process is suitable for the removal of carbon monoxide from any gas mixture containing it, whether the composition be comparatively simple or rather complex, and, therefore, for all kinds of town gas. The process is well suited also for producing synthesis gas for the Fischer-Tropsch hydrocarbon synthesis from water gas, by bringing the proportions of carbon monoxide and hydrogen into the ratio 1 : 2. In this case a partial conversion only of the carbon monoxide is effected and removed as carbon dioxide, so that a gas mixture in suitable proportions for the synthesis is obtained, and this can be carried out in the same plants as those used for the complete conversion. The principal part of the plant is in the open-air, but a small building is required for the mechanical, electrical, and control operations. The plant is operated by one man on each shift; the service of a second man is required only in large plants handling from 3,000 to 5,000 cubic metres of gas hourly. Plants for large performance are arranged in battery form, that is, with several contact furnaces and several regenerators, and the operation is semi-automatic. The starting up of the plant is simple and requires only a few hours.

Many Advantages

This new process for the removal of carbon monoxide from gases has many advantages. It is applicable to any carbon monoxide-containing gases, or mixtures of such gases. It allows the simultaneous conversion of carbon monoxide to carbon dioxide and absorption of the latter to any desired degree. There is smaller steam consumption through utilising the exothermic effect of the conversion, and also the utilisation of the surplus of such heat in the production of electric energy. The contact material is cheap and the consumption of it is small. The process, moreover, is simple, quick, and safe in operation, it is early adaptable to changes in operation and to different gases or mixtures of gases; needs no extra production of coal gas than in normal coal gas production; and involves no increase in the coke production. It removes organic sulphur compounds from the gas mixture and avoids the after-purification from hydrogen sulphide, and also gives selective employment possibilities for making gas mixtures non-poisonous or of producing synthesis gas.

United States Mercury Industry

Advance Statistics for 1936

THE output of mercury in the United States in 1936 amounted to 16,569 flasks, compared with 17,518 flasks in 1935. Production declined despite increased demand and higher prices for the metal. The lower rate of production, however, was not uniform for among the important producing areas Arkansas and Oregon accounted for larger quantities than in 1935. Imports of metal into the United States in 1936 were considerably more than twice the amount received in the preceding year, and this increase accounted for the much larger supply of mercury for 1936.

The international mercury situation, according to the United States Bureau of Mines, continued to be dominated by the civil war in Spain, where the largest mercury reserves of the world are located, and by the large demands for metal in the principal mercury consuming nations of the world, partly for armament preparations and partly because of fears concerning future supplies. An event of utmost importance in the international situation was the sudden breaking up of the cartel agreement between Spain and Italy. Barring the possibility of destruction of the Almaden mine workings and reduction equipment in Spain, the dissolution of the mercury cartel would seem to forecast a renewal of the competitive conditions that prevailed prior to the formation of this organisation. In the United States, the larger amount of mercury used for placer gold mining in western States reduced the amount of metal available for shipment.

Society of Glass Technology

Papers Presented at the Scottish Meeting

ALTHOUGH the Society of Glass Technology in November of this year will celebrate its 21st birthday, it was not until the end of last month that it paid its second visit to Scotland, the first having taken place in 1920. On the present occasion, May 27-29, a varied programme was carried through, including visits to works, technical sessions, and a motor tour of the "Three Lochs."

The works visited were (a) The Levenseat Sand Quarries, of General Refractories, Ltd., who also entertained members to luncheon at the North British Hotel, Edinburgh; (b) The Edinburgh and Leith Flint Glass Works, Edinburgh; and (c) The Castlecary and Manuel Works, of John G. Stein and Co., Ltd., manufacturers of refractory materials. The Scottish glass manufacturers entertained members to luncheon in Glasgow, and also acted as host on the motor tour of the "Three Lochs." The technical sessions were held on May 28, at the Royal Technical College, Glasgow, where members were welcomed by the director of the college, Sir Arthur J. C. Huddleston.

Ternary Diagrams

A paper on "The Ternary System $FeO—Al_2O_3—SiO_2$" was presented by Professor R. Hay, Ph.D., F.I.C.; Dr. J. White, B.Sc., Ph.D.; and Mr. T. H. Caulfield, B.Sc. Dr. J. White stated that work on thermal diagrams had been carried out for the last few years in the Metallurgy Department of the Royal Technical College, Glasgow. The system now described was studied by taking heating and cooling curves of mixtures contained in molybdenum crucibles. To enable heating to be carried out in a neutral atmosphere a "Pythagoras" tube was inserted in the molybdenum wound furnace employed.

The main features of the ternary diagram were that no ternary compound appeared to exist, but that the binary compounds fayalite ($2FeO.S.O_2$), spinel ($FeO.Al_2O_3$), and mullite ($3Al_2O_3.SiO_2$) occurred. There were three ternary eutectics at approximately FeO 62, Al_2O_3 3, SiO_2 35 per cent. (melting point 980° C) FeO 68, Al_2O_3 3, SiO_2 29 per cent. (melting point 1,002° C) and FeO 72, Al_2O_3 3, SiO_2 25 per cent. (melting point 1,080° C). These were connected by a series of binary eutectic troughs running from the silica mullite eutectic to the ferrous oxide-spinel eutectic. With Al_2O_3 contents above 5 per cent. approximately the liquidus surface rose very steeply, giving very long melting ranges, the temperature rising regularly to 2,050° C, the melting point of pure Al_2O_3. A fourth ternary point resulted from the intersection of the peritectic planes of mullite and spinel and gave rise to a dip running up the liquidus slope. Alongside this dip and corresponding to the position of the mullite faylite binary occurs a well-marked ridge.

Slagging of Firebricks

The practical applications of this diagram to the slagging of firebricks in contact with slags containing ferrous oxide, and to the vitrification of clays containing iron oxides were indicated.

A note by Mr. H. C. Biggs pointed the growing importance of "refractoriness under load" tests in view of the extended application of insulating materials in glass furnaces. Ordinary refractoriness of a material offered no key to its high temperature load-bearing capacity. Mr. Biggs fully described an apparatus which had been designed in the research laboratories of John G. Stein and Co., Ltd., for determining this property, emphasising the essential requirements of any method of applying this type of thest. The special form of apparatus described could be utilised for tests in which (a) under a fixed load the temperature was increased at a standard rate, a continuous record being made of the alteration in height of the test piece, and (b) under conditions of fixed load and constant temperature a record was made of the rate of subsidence of the specimen. Readings were obtained by an Ames dial, and a modification of the loading and recording arrangement enabled the influence of the expansion of the refractory support and pressure-transmission rod to be eliminated.

The ferrous-ferric oxide equilibrium in glasses with some reference to practical applications, was the subject of a paper by Mr. N. E. Densem, M.Sc.Tech., and Professor W. E. S. Turner.

Mr. Densem, who presented this paper, stated that the relative amounts of ferrous and ferric oxides in a glass depended upon several factors important among which were (1) the temperature of melting; (2) the temperature of any subsequent heat treatment; (3) the duration of heating in (1) and (2); (4) the nature of the atmosphere during melting or reheating; (5) the viscosity of the glass; (6) the specific effects due to the basic or acidic nature of the glass; and (7) the effect of the concentration of iron oxide. He described experimental work which had been in progress for several years in the Department of Glass Technology at Sheffield, forming a systematic investigation into the iron oxide equilibrium in soda-lime-silica glasses of different compositions and varying iron contents. The glasses, prepared from pure materials, were melted in platinum in an electric furnace.

Under the given melting conditions the maximum dissociation of the ferric oxide (of the order of 36 per cent.) took place when the total iron content was equivalent to 0.04 per cent. Fe_2O_3. The colours of the glasses were described, and also the effects of prolonged melting time, and reheating. Series of simple soda-silica, potash-silica, and lithia-silica glasses in which the alkali content was gradually increased whilst the iron content was kept constant yielded evidence that iron was more powerful as a colouring agent in soda than in potash glasses; and that, as the alkali content was increased there was a decrease in the percentage dissociation of the ferric oxide.

Specification for Limestone

A proposed specification for limestone for the manufacture of colourless glass was presented by Miss Violet Dimbleby, M.Sc., as a report from the Standards Committee of the Society of Glass Technology." Miss Dimbleby explained that a lengthy investigation involving considerable practical work had been carried through by the committee during the last three years. She briefly quoted the main portion of the specification, explaining that the appendix contained full instructions for the sampling and examination of limestone, but that she was quoting only the first portion, dealing with sampling and packing, as the remainder, dealing with mechanical, microscopic, and chemical tests, was too long to be included in the short time available. She uttered a warning, however, as to grading, stating that the sieving of the limestones was to be done by hand, as considerable discrepancies had been found to arise between hand and some machine sieving. Until further work could be done on this point the committee considered it desirable to adhere to hand sieving in the tests.

Barytes Production in Italy

CONSIDERABLE progress has been noted recently in the production of barytes in Italy, and while there are no statistics available showing the annual output, it is reported to have increased considerably. On account of the pure white colour of the barytes, the product is finding outlets in foreign markets. All producers of barytes are combined under the Societa Commissionaria Baritina of Milan, and this company has charge of 90 per cent. of all domestic sales as well as exports.

Etablissements Kuhlmann

Annual General Meeting

A 14 PER CENT. increase in sales in 1936, as compared with the previous year, was reported at the annual general meeting of Etablissements Kuhlmann, the important French chemical manufacturing concern. In his report, M. Duchemin, chairman of the board, points out that sales figures would have been substantially higher if selling prices had been able to follow the rise in prime costs.

The increase in the sales of phosphoric, ammoniacal and nitrogenous fertilisers was particularly noteworthy, and stocks on hand of these had been disposed of. In the case of general chemicals, sales showed a slight improvement, while the turnover of the mineral department had increased by 14 per cent. on the previous year. Sales of organic compounds showed an increase of 15 per cent., this being achieved by the introduction of new brands of dyes, subsidiary dyeing materials, and synthetic products. Other branches of production were also sharing in the upward movement. In order to cope with the bigger volume of business, the technical department of the company had modernised the Dieuze salt works, and the sulphuric acid plant at the Penarroya factory had been completed. In addition, final plans had been drawn up for the new synthetic benzene works of their subsidiary, Courrieres-Kuhlmann.

In the trading report particulars are given of the progress of the individual subsidiary companies, the Anzin-Kuhlmann, the Courrieres-Kuhlmann, and the Marles-Kuhlmann. It is stated that the steady decline in the consumption of superphosphate has at last ceased, although the 1937 spring season left much to be desired owing to the fact that consumers bought ahead of their demands last autumn in anticipation of a price rise. However, the sales of lime and allied products are developing favourably, and the report also expresses the confidence of the board in the prospects of the subsidiaries producing dyestuffs, pointing out that total French consumption increased from 23,039 tons in 1935, to 29,165 tons last year.

At the annual general meeting the chairman criticised strongly the way in which the new social legislation had been introduced. He emphasised that he in no way opposed the character and tendency of the new social laws, but rather complained of the too hasty introduction of the code, which did not take into account the problem of foreign competition. However, the company would maintain its economic equilibrium on the one hand by a policy of progressive price increases to balance the increased social expenditure and the rises in the prices of raw materials, and on the other by financial economies and technical improvements.

New Industries for Durham

Important Extension to Silica Brick Works

HAVING acquired the silica brick works of W. H. Girling and Co., Ltd., at Crook, General Refractories, Ltd., of Sheffield, have decided on important extensions to the property and may decide to move some of their other manufacturing processes to this town in Durham. In a special statement to THE CHEMICAL AGE, the chairman of General Refractories, Ltd., Mr. Frank Russell, said that he regards Crook as "an eminently suitable site for industrial enterprises," this opinion being based on a personal visit to the town some days ago, when the decision to develop the Girling works was made.

Mr. Russell had received an invitation from the Crook Development Committee, which was recently formed to attract new industries. Accompanied by several assistants, he made a tour of the district, and besides inspecting the brickworks was shown over the new housing estates. Since the war, over 300 working-class houses have been built at Crook, while at the present time a further 124 houses are in the course of erection. Several coal mines closed during the depression have been reopened in the past few months, and it has just been announced that Pease and Partners, Ltd., are to re-start Wooley colliery, one of the largest in the district, which will employ at least 400 men. The same company already operate the Bankfoot by-products works and a number of smaller undertakings at Crook, where unemployment has fallen by nearly 1,000 in the past eighteen months.

The local Development Committee are inviting inquiries from other manufacturers in the south who could supply the north of England market more economically from Crook, due to the saving in carriage charges. A pamphlet on the industrial facilities available at Crook explains that the town was named in the fifteenth century after a bend in the local river resembling a shepherd's crook, and has no responsibility for the more recent meaning of the word exploited by Hollywood! The pamphlet may be obtained from the hon. secretary, Dr. Fenwick Lishman, "Hawthornside," Crook, who will send his car to meet visitors at Darlington, Durham or Newcastle, by appointment.

Chemicals in New Zealand

Considerable Increase in Superphosphate

NO MARKED change occurred in the New Zealand chemical market during the second half of 1936, and demand was brisk for the chief chemicals ordinarily consumed in the Dominion. Imports of the leading chemicals and allied products imported into New Zealand during the calendar year 1936 exceeded £1,920,000, an increase of 7 per cent. compared with 1935. The increases in imports were chiefly in fertilisers, insecticides, and paints and varnishes. Imports of paints and varnishes advanced from £373,086 in 1935 to £415,493 in 1936, most of which was imported from United Kingdom and Australia.

A considerable increase in the manufacture of superphosphates was reported during the year. Owing to the larger income accruing to farmers from improved prices for wool and dairy products, more money was expended on fertilisers. Although total sulphur imports declined from 953,173 cwt. in 1935 to 644,859 cwt. in 1936, those from the United States advanced 284,017 to 387,179 cwt.; Japanese sulphur still competes strongly with the American product because of its cheaper price.

Disinfestation of Steamships

Chemical Tests at Liverpool

CHEMICAL means of combating the infestation of steamships are referred to in the annual report of Dr. W. M. Frazer, Medical Officer of Health to the Liverpool Port Sanitary Authority.

The Medical Officer will not grant certificates of disinfestation until after tests have been applied with sulphur dioxide and hydrogen cyanide. When sulphur dioxide is used the gas is generated by burning 3 lb. of sulphur per thousand cu. ft. of air space with the minimum exposure of eight hours. Sulphur of good quality has to be used and distributed in open containers or buckets of not more than 9 lb. When liquefied sulphur dioxide is used 2 lb. of liquefied gas are necessary for each lb. of sulphur.

Concerning hydrogen cyanide, this is produced by the vaporisation of liquid HCN, a minimum of 2 oz. per thousand cu. ft. of air space for holds, and 1 oz. per thousand cu. ft. of air space for superstructures is necessary. If Zyklon B. is used 50 grams per thousand cu. ft. are necessary. The minimum time of exposure is two hours. A third method relies on the use of salforkose. The quantity used is 18 oz. per thousand cu. ft. and the minimum exposure is three hours.

Fumigations in the port of Liverpool are, as a rule, carried out by private firms under the supervision of the Port Sanitary Authority.

School Girl's Laboratory Accident

Jury Award £3,000 for Loss of Eye

DAMAGES amounting to £3,119 5s. 6d. against Townson and Mercer, Ltd., were awarded in the King's Bench Division on Wednesday, in an action, in which Miss Rita Elizabeth Marjorie Juliette Kubach, aged 13, suing by her father, Mr. Frederick William Kubach, a City merchant, of Sylvan Road, Upper Norwood, S.E., claimed damages for the loss of an eye caused by an explosion in a laboratory at Park School, Lancaster Road, South Norwood, S.E., on January 17, 1936. Mr. Kubach also claimed special damages.

The action came before the Lord Chief Justice and a special jury.

The defendants were Miss Mary Elizabeth Hollands, proprietress and headmistress of the school, and Townson and Mercer, Ltd., wholesale and retail chemists, of Camomile Street, E.C., the claim against the first defendant being for damages for alleged breach of contract and negligence, and damages for alleged negligence against the second defendants. The second defendants brought in Frederick Allen and Sons (Poplar), Ltd., manufacturing chemists, of Upper North Street, E., as a third party.

An Oxygen-Making Experiment

The first defendant denied liability, and said that the accident was caused by chemicals negligently supplied to her by the second defendants. The second defendants denied liability, and said that they sold the chemicals as they were received from the third party. The third party denied that the chemicals were supplied by them, and pleaded, alternatively, that if they were the second defendants were themselves negligent.

Mr. F. J. Tucker, K.C., in opening the case for the plaintiffs, said that Rita Kubach was a pupil at Miss Holland's school in January, 1936, and on the 17th of that month she was deputed by Mrs. Gilbard, the science mistress, to carry out with six other girls a chemistry experiment to make oxygen. Rita was the girl who was deputed to hold the test-tube which contained the chemicals to be heated.

Directly the heat was applied there was an explosion, and despite the skill of surgeons one of the girl's eyes had to be removed. That could not have happened but for the carelessness of somebody. The chemicals used had been analysed, and it had been found that that which was thought to be manganese dioxide contained 10 parts of antimony sulphide, which was a dangerous chemical likely to explode, especially under heat.

It appeared that on the previous day the science mistress had bought from Townson and Mercer, Ltd., what she thought was one pound of manganese dioxide, explaining the use to which it was to be put. That substance was used in the experiment by Rita. On those facts the plaintiffs said that either Miss Hollands or Townson and Mercer, Ltd., were liable.

The Consequence of an Explosion

Miss Kubach, giving evidence, explained how the science mistress instructed her and her fellow-pupils to carry out the experiment with manganese dioxide and another chemical which were handed to her. She was working for the experimental part of the Junior Oxford local examination. While she was holding the tube over a flame there was a loud explosion. The next thing she remembered was that she was in another room having her eye attended to by Mrs. Gilbard, who had been in and out of the laboratory all the time.

Mrs. Rita C. H. Gilbard, B.Sc., a member of the Society of Public Analysts and a science mistress for 14 years, said that the chemicals used at the school were always obtained from Townson and Mercer, Ltd.

Cross-examined by Mr. Rowland Thomas, K.C., appearing for the second defendants, witness agreed that it would be impossible without analysis to discover that there was antimony sulphide in the manganese dioxide; the difference in the appearance of the two chemicals was only a question of degree of blackness.

Technical evidence was given to the effect that in the proportion of 10 parts antimony sulphide to one of manganese dioxide the mixture was dangerous. Under heat it would tend to detonate.

Mr. Blanco White, K.C., appearing for the first defendant, submitted that there was no evidence of negligence on the part of the headmistress of the school. The chemicals were obtained from reputable suppliers, and whatever the position of the second defendants was Miss Hollands could not be held to be liable for the accident.

Antimony Sulphide

Addressing the jury, Mr. Thomas said that the antimony sulphide was kept by his clients in a drawer some distance away from the one which contained the manganese dioxide. They could not have taken greater care.

Mr. Stanley George Jones, manager to Townson and Mercer, Ltd., said that they obtained their supplies of manganese dioxide from Frederick Allen (Poplar), Ltd., in 28 lb. parcels. On December 30, 1935, a consignment was delivered by that company and was placed in the proper drawer, which was about 21 ft. from the one which contained antimony sulphide. It was very difficult to detect the difference between the two chemicals by looking at them. Witness added that his company supplied 50 per cent. of the schools in and around London with chemicals.

Mr. F. A. Hatch, consulting and analytical chemist, said that he had taken samples from Townson and Mercer, Ltd., and had found them, on analysis, to be mixtures of manganese dioxide and antimony sulphide.

Mr. Tucker agreed that there was no evidence against Miss Hollands of negligence, but contended that Mr. Kubach was entitled to special damage for breach of contract in not supplying proper materials for experiment.

Questions to the Jury

His Lordship, in summing up, said that there was now no complaint so far as Miss Hollands was concerned, except that Mr. Kubach said that she had been guilty of breach of contract because she had failed to supply proper materials for use in the school. He (his Lordship) thought that the jury's answer to the question: Was there a breach of contract on her part? could well be answered in the negative. With regard to the second-named defendants, he laid stress on the fact that they had not passed on to their customer the warning that the chemicals supplied should be examined and tested before use.

The following questions were left to the jury, whose answers are appended:—

Was there a breach of contract on the part of the first-named defendant?—No.

Was there negligence on the part of the second-named defendants?—Yes.

Were the first or second-named defendants, or both, responsible for the injury to the girl?—The second-named defendants only.

The jury awarded the girl £3,000 damages, and her father £119 5s. 6d. special damages.

Judgment for the plaintiffs against Townson and Mercer, Ltd., was entered accordingly, with costs. Judgment was entered in favour of the first defendant.

The claim by Townson and Mercer, Ltd., against the third party for an indemnity remained to be argued on Thursday.

Old Centralians

Thirty-fourth Annual Dinner

A DISTINGUISHED company of members and guests of the Old Centralians—the Old Students' organisation of the City and Guilds (Engineering) College—assembled at the Connaught Rooms, Great Queen Street, London, on June 11, the occasion of their annual dinner. It was a very pleasant and informal function. Mr. E. G. Walker presided, and the company included Sir John Thornycroft (President of the Institution of Mechanical Engineers), Mr. H. T. Young (President of the Institution of Electrical Engineers), Mr. S. B. Donkin (President-elect of the Institution of Civil Engineers, Dr. C. H. Desch (Department of Metallurgy, National Physical Laboratory), Dr. C. H. Lander (Dean of the College), Sir Henry Tizard (Rector of the Imperial College of Science and Technology), and Mr. G. C. Stephenson (secretary, City and Guilds of London Institute).

A Message to Professor Armstrong

A message of greeting was sent from the gathering to Professor H. E. Armstrong, F.R.S., who has taken a great interest in the work of the Association for very many years; and to Professor Mather, who was rather seriously ill.

Sir JOHN THORNYCROFT (President of the Institution of Mechanical Engineers) proposed a toast of the City and Guilds College. In anticipation of that privilege, he had paid a visit to the Dean of the College that day so that he was the better able to note the efficiency with which the training was carried out there. He paid a tribute to the Dean and all who were associated with it.

Dr. C. H. LANDER (Dean of the College) responded, and in the course of his remarks he referred to a new course of chemical engineering which was being instituted there. For many years past, he said, there had been in the Imperial College a course of a post-graduate type, for chemical engineering which was being instituted there. For many years past, he said, there had been in the Imperial College a course of a post-graduate type, for chemical engineers who had been essentially chemists. Almost all the entrants for that course had been men holding degrees in honours chemistry and who had required a "top dressing" of engineering.

Chemical Engineering Courses

In organising the new course, which had involved a great deal of work on the part of the governing body and the staff, he had been surprised to find how wide chemical engineering could be. It seemed to him that every department of the College considered their own branch of study, whether mathematics, botany, palaeontology or anything else, to be an essential feature of the training of a chemical engineer, and at one time he had almost concluded that the last thing to give a chemical engineer in the course of his training was engineering! However, the new course was, he believed, well balanced. It was the result of an attempt to provide a course somewhat similar to the early course in electrical engineering, but one in which chemistry played a part somewhat analogous to that which physics had played in the electrical engineering course. In other words, the College authorities looked forward to a definite marriage between chemistry and engineering to produce individuals who would breed true. Normally, the course would occupy four years, but some students might enter during their second year, so that they could take the course for three years. The authorities were very hopeful concerning the usefulness of the course. It seemed that it would supply a real need, particularly for some of the smaller industries in which firms might not be large enough to be able to employ fully qualified engineers and chemists; the marriage might produce offspring of great use to such industries.

Mr. L. J. CARDEW WOOD proposed a toast to the guests. Time did not permit him to mention them all individually, but he offered a special welcome to Mr. P. J. Neate and Mr. P. M. Evans. Both were Past Masters of the Clothworkers' Company, and both had sat on the City and Guilds Institute Committee for many years and had worked very hard for the College. He believed Mr. Neate had been largely responsible for securing a large Jubilee grant from the Clothworkers' Company to the College.

Mr. D. F. ORCHARD (chairman of the City and Guilds Engineering Society), responding, expressed his Society's great appreciation of the kindly interest taken in its activities by the Old Centralians. The Old Centralians, he said, had been doing some particularly valuable work during the last few years. Their advice on matters concerning the College course and the prospects of engineering abroad was of very great value to young engineers.

Mr. ASA BINNS (chief engineer, Port of London Authority), proposing a toast to the Association of Old Centralians, with which he coupled the name of the president, Mr. Walker, complimented the Association on its fine work.

THE PRESIDENT (Mr. Walker), in his response, said it was pleasing that the Association of Old Centralians was flourishing. It had started as a small organisation, formed for the purpose of enabling past students to keep in touch with one another. In the course of its 40 years existence its members had worked in all parts of the world; its membership included many men of national eminence in many walks of engineering, whose knowledge of engineering was of great value. It did all it could to help the City and Guilds Institute by forwarding the interests of the College.

Business Classes versus Politicians

Sir Ernest Benn on a Revolt

THE suggestion that the time is ripe for a revolt by the business classes against politicians and the political idea was made by Sir Ernest Benn, the chief proprietor of THE CHEMICAL AGE, when he spoke at a luncheon given by the Brighton and Hove Chamber of Commerce and Trade to the officers and Council of the Advertising Association at Brighton, on Monday.

Sir Ernest said "I venture the very simple suggestion that the time is ripe for a revolt against the notion that the vote can take the place of work and value. In such a revolt the business classes have rather a good story to tell. We are the people who made civilisation, and we are the only people who can save it. We contribute 1,000 millions a year in rates and taxes for all the madness of politics. We submit to every sort of interference and are out of the picture. If something wants doing, a committee is formed of politicians and bureaucrats to decide how it is to be done. It is never thought wise to leave it to the forces represented in this gathering to do the job better, quicker and cheaper.

This revolt idea gains strength when you remember the history of the last few weeks. We have shown our quality in a way we are entitled to emphasise. We have killed the National Defence Contribution and with our eyes open. We have killed a bad tax with the certain knowledge that we shall pay more for any substitute. That is a wonderful illustration of the quality of the business classes.

"We can and should take up, as business classes, the demand for some regard to economy in public expenditure. We know we are in a boom with all the dangers of the slump that will follow. We know we have spent £1,500,000,000 on arms, and it is merely common business sense to shut up on those grandiose schemes by local authorities, which can very well wait until we want a little work to do."

Concluding, Sir Ernest said "Life is a joke, a tragic joke, so long as we allow the politician and bureaucrat to remain on top. Only when the business classes once more assert themselves will life in general become once more happy and contented and useful."

Institute of Fuel

Students' Medal to be Awarded Annually

To encourage the reading of papers by students of fuel technology, the Council of the Institute of Fuel have decided to make an annual reward of a medal, together with a prize consisting of books and/or instruments to the value of £5.

The rules governing the award of this prize and medal stipulate that the paper must be submitted by a student member of the Institute or by any student under 25 years of age of a university or technical college in the United Kingdom. The paper shall deal with some subject relating to the preparation or utilisation of fuel, or allied subjects, and must be submitted to the Secretary of the Institute under a "nom de plume," the name and address of the author being enclosed in a sealed envelope and sent with the paper. Papers must be received by the Secretary on or before September 1 in any year.

The name of the successful competitor in each year will be announced at the October meeting of the Institute, and the award will be presented at the annual dinner, at which the prize winner will be the guest of the Institute. The Institute, however, reserves the right to withhold granting a medal in any year if, in the opinion of the Papers Committee, no applicant deserves the award.

Papers must be limited to a maximum content of 6,000 words, and may be illustrated by line drawings or photographs. The paper earning the award may be published in the Journal of the "Institute of Fuel." In judging the papers which are submitted, consideration will be given to (a) subject matter, (b) evidence of analytical power and logic, (c) construction of paper in so far as it gives evidence of an orderly mind and shows continuity of argument with an orderly development of the theme, and (d) English.

Full particulars can be obtained on application to the Secretary, Institute of Fuel, 53 Victoria Street, London, S.W.1.

Holidays with Pay

T.U.C. Demands in the Chemical Industry

The Trade Union Congress has cognisance and collective agreement for holidays with pay in both the light and heavy chemical industry, pointed out Sir Walter Citrine (general secretary) in his evidence at the resumed sitting of the Special Governmental Holidays with Pay Committee, which is being presided over by Lord Amulree. Other allied industries that had embraced the principle were oil refining, salt manufacture, paint, colour and varnish manufacture, soap and candle manufacture, and match manufacture. Individual firms known to be operating holidays with pay schemes included: Chemists: Evans, Sons, Leather and Webb, Ltd., Liverpool; soap manufacturers: Lever Bros., Liverpool; match manufacture: Bryant and May, Liverpool; chemical manufacture: Wylie's Chemical Works, Ayrshire; dye manufacture: British Dyestuffs Corporation, Liverpool; salt production: Salt Union, Ltd., Widnes; metal manufactures: I.C.I. Metals, Ltd., Birmingham; alloy manufacture: Henry Wiggin and Co., Ltd., Glasgow and Birmingham; polish manufacture: Shino Metal Polish, Liverpool; distillation of coal: Low Temperature Carbonisation, Ltd., Askern, near Doncaster.

The scheme now put forward by the T.U.C., was that of a compulsory 12 working days holiday with pay exclusive of bank and other public holidays to all employed persons after twelve months service of not less than 1,800 working hours, and of not less than one day per month for anyone with less than twelve months service. The qualifying period could be spent in the service of one or several employers, and as a general rule, the holiday should be taken in one unbroken period, preferably between the months of April and October. The holiday payment should be such as may be decided by collective agreement or other established negotiating machinery in the industry concerned, but all persons should receive as a minimum the customary hourly or weekly time rate provided for their grade as defined by any collective agreement. The contract of service should not be broken by trade dispute.

Presenting his proposals, Sir Walter said the present position of holidays with pay in Great Britain left much to be desired, and compared poorly with other countries. Out of a total employed population of about 18,000,000, there could not be more than 4,000,000 who were at present in receipt of holidays with pay of even a week's duration. The need for holidays had certainly increased in recent years. Employment to-day was far more exacting; not merely had industry become more highly mechanised or "rationalised," but it was constantly meeting change and the effect could easily be imagined. This imposed upon workpeople and management alike the strain of continual re-adjustment. It had been stated that the cost of a fortnight's holiday with pay would be equal to 4 per cent. on the annual wage bill, but this calculation required adjustment, and the T.U.C. did not agree that the cost would be anything like as high. The actual cost would vary in each industry, according to the proportion of wages to total cost of production. An estimate made in 1928 showed the lowest proportion as 4.7 per cent. in the production of steel billets, and the highest as 74.3 per cent. in coal mining. Even if the grant of an annual holiday with pay had no beneficial effect upon health, and thereby upon production, and even if it were to cost the full 4 per cent. of the total wages bill, the T.U.C. could not agree that the cost was excessive or that British industry could not afford it.

The inquiry was adjourned for the taking of further evidence.

Anglo-Iranian Oil Co., Ltd.

Refining Capacity Increased

The Anglo-Iranian Oil Co., Ltd., which recently announced a striking expansion in profits, has now issued its full report for 1936.

Total income has spurted from £6,129,645 to £9,624,434 and net earnings are up from £3,519,183 to £6,123,469. The final ordinary dividend of 15 per cent., which is accompanied by a 5 per cent. cash bonus makes a total of 25 per cent. for the year, against 15 per cent. Allocations to general reserve are resumed after a lapse of five years. There is this time a transfer of £1,200,000. After allowing £514,976, compared with £408,747, for extra depreciation, a balance of £402,135 is taken forward.

The directors propose to capitalise £2,327,500 from debenture stock redemption reserve and £4,385,000 from general reserve for the creation and issue as a capital bonus of 6,712,500 new ordinary shares of £1 each, fully paid, at the rate of one new share for each £2 of ordinary stock held on June 30 next, fractions being adjusted in cash. When the new shares have been issued they will be converted into stock.

The company's expansion is reflected in the balance sheet. Stocks of stores and materials, etc., have risen from £801,407 to £1,210,445, while stocks of crude oil and products, etc., are given at £2,504,505 against £2,575,340. Debtors and debit balances are up from £1,896,161 to £2,553,007, and accrued interest and dividends from £1,798,790 to £1,831,257. Cash has increased by £1,465,733 to £3,457,258, and creditors by £1,009,934 to £5,791,283.

Crude oil production, the pipeline system and refining capacity have been increased to meet the growth in demand for the company's products. Drilling in Iran in areas other than the main fields is being actively carried on, and indications give promise of satisfactory results, states the report. In the United Kingdom drilling has so far not resulted in the discovery of oil, but work is being actively pursued in several areas.

British Overseas Chemical Trade in May

ACCORDING to the Board of Trade returns for the month ended May 31, 1937, exports of chemicals, drugs, dyes and colours were valued at £2,135,035 as compared with £1,811,896 for May, 1936, an increase of £323,139. Imports were valued at £1,038,810 as compared with £956,981 for May 1936, an increase of £81,829. Re-exports were valued at £37,889

	Quantities. May 31		Value. May 31	
	1936.	1937.	1936.	1937.
Imports				
Acids—				
Acetic .. .. cwt.	13,955	15,422	17,344	17,172
Boric (boracic) ,,	4,722	5,301	4,729	5,277
Citric .. .. ,,	2,536	2,102	10,267	8,295
Tartaric .. ,,	4,680	3,543	19,055	14,688
All other sorts .. value	—	—	6,204	7,739
Borax .. .. cwt.	19,825	35,508	11,267	19,549
Calcium carbide .. ,,	88,708	96,463	46,837	49,966
Fertilisers, manufactured—				
Superphosphate of lime tons	1,708	2,436	3,332	5,983
All other descriptions ,,	888	610	6,821	2,696
Phosphorus .. cwt.	49	10	228	61
Potassium compounds—				
Caustic and lyes ,,	11,638	14,263	12,751	14,586
Chloride (muriate) ,,	40,202	20,600	13,311	7,630
Kainite and other mineral fertiliser salts cwt.	48,340	26,140	7,256	3,716
Nitrate (saltpetre) ,,	5,044	2,435	4,095	2,273
Sulphate .. ,,	10,840	15,060	4,892	6,787
All other compounds ,,	8,255	8,158	11,314	11,194
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	1,042	262	441	111
Chromate and bichromate .. .. cwt.	1,003	1,070	1,209	1,217
Cyanide .. ,,	4,201	3,227	8,395	7,148
Nitrate .. .. ,,	57,000	62,260	13,426	13,572
All other compounds ,,	25,888	21,132	20,888	16,794
Other chemical manufactures .. .. value	—	—	256,588	338,399
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	194,800	125,698	14,381	10,153
Medicinal oils .. cwt.	3,021	4,260	6,632	13,300
Proprietary medicines value	—	—	33,773	48,036
All other sorts .. ,,	—	—	48,896	55,395
Dyes and extracts for tanning—				
Finished dye-stuffs from coal tar .. cwt.	5,009	3,357	146,817	102,746
Extracts for dyeing ,,	4,551	7,350	7,738	18,115
Extracts for tanning (solid or liquid)—				
Chestnut .. cwt.	23,887	27,882	15,686	18,882
Quebracho .. ,,	9,937	6,733	8,477	6,149
All other sorts ,,	74,185	59,804	55,059	45,130
All other dyes and dyestuffs .. .. cwt.	639	627	15,538	13,295
Painters' colours and materials—				
White lead (basic carbonate) .. cwt.	8,094	6,575	10,353	10,135
Lithopone .. ,,	27,630	25,200	17,304	15,242
Ochres and earth colours cwt.	43,623	24,791	12,771	7,924
Bronze powders ,,	3,690	1,753	12,018	12,854
Carbon blacks ..	22,601	46,241	33,796	63,396
Other pigments and extenders, dry .. cwt.	32,251	48,707	8,414	12,014
All other descriptions ,,	12,667	16,234	28,678	31,191
Total .. value	—	—	956,981	1,038,810
Exports				
Acids—				
Citric .. .. cwt.	3,874	2,917	16,418	13,555
All other sorts .. value	—	—	24,156	27,701
Aluminium compounds tons	2,599	4,164	21,375	42,938
Ammonium compounds—				
Sulphate .. tons	19,761	29,823	114,434	175,918
All other sorts ,,	1,331	823	14,076	13,005
Bleaching materials—				
Bleaching powder (chloride of lime) .. cwt.	47,594	64,179	12,244	18,485
All other sorts .. ,,	7,056	5,077	17,151	11,347
Coal tar products—				
Cresylic acid .. galls.	197,978	241,275	22,498	43,686
Tar oil, creosote oil, anthracene oil ,,	4,271,899	2,638,423	106,921	69,536
All other sorts .. value	—	—	20,124	26,199
Copper, sulphate of tons	2,893	2,730	40,454	58,233
Disinfectants, insecticides, etc. .. .. cwt.	29,722	33,110	61,191	69,124
Fertilisers, manufactured tons	7,617	30,893	31,017	68,284
Glycerine .. .. cwt.	10,680	11,593	27,176	51,633
Lead compounds .. ,,	12,980	16,482	16,872	29,528
Magnesium compounds tons	419	490	10,737	12,799
Potassium compounds cwt.	4,359	6,821	9,330	12,266
Salt (sodium chloride) tons	23,767	20,090	57,784	56,154
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	352,417	343,383	76,036	68,027
Caustic .. .. cwt.	168,264	229,436	87,418	89,695
Nitrate .. .. ,,	10,124	1,782	7,848	634
Sulphate, including saltcake .. .. cwt.	65,613	38,067	5,921	4,861
Chemical manufactures and products .. value	—	—	17,141	21,575
Drugs, medicines and medicinal preparations value	—	—	12,010	12,694
Dyes and extracts for tanning .. .. cwt.	1,971	2,062	1,951	3,043
All other sorts .. ,,	62,460	73,937	76,235	90,539
Zinc oxide .. tons	1,207	1,536	22,377	37,336
All other descriptions value	—	—	222,344	236,092
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts .. .. oz.	102,199	72,622	11,912	8,303
Proprietary medicines value	—	—	91,691	104,215
All other descriptions ,,	—	—	135,430	153,598
Dyes and extracts for tanning—				
Finished dye-stuffs from coal tar—				
Alizarine, alizarine red and indigo (synthetic) cwt.	1,720	1,779	11,862	12,778
Other sorts .. ,,	7,078	9,210	95,366	109,920
Extracts for tanning ,,	19,143	24,924	16,455	23,156
All other descriptions ,,	2,976	2,612	11,422	11,882
Painters' colours and materials—				
Ochres and earth colours cwt.	22,981	19,902	17,215	14,535
Other descriptions ,,	32,668	21,570	39,486	38,051
White lead .. ,,	4,632	3,441	9,564	8,100
Paints and painters' enamels, prepared cwt.	43,005	51,826	118,216	140,706
Varnish and lacquer (clear) .. galls.	71,392	100,185	28,630	36,897
Printers' ink .. cwt.	5,068	4,600	24,206	25,836
All other descriptions ,,	37,084	61,454	78,304	119,483
Total .. value	—	—	1,811,896	2,135,035
Re-Exports				
Painters' colours and materials .. .. cwt.	873	283	1,211	577
Total .. value	—	—	32,313	37,889

New Technical Books

SILICATE ANALYSIS. By A. W. Groves. Pp. 230. Thomas Murby and Co. 12s. 6d.

This book differs from previous books dealing with the chemical analysis of natural and artificial silicates in that, in addition to the chemistry, it gives also the requisite amount of mineralogy and petrology. The chemist will find in it a comprehensive account of analytical procedure, and also important chapters on sampling and crushing, constituents to be determined, location of errors, limits of error, search for further constituents when the total is short, and calculations as a check on the accuracy of chemical analyses. A further departure is that special methods are given for use when material is scanty. Notes on various technological applications and other special cases are also given. The book will be found to contain a great deal of information useful to a wide range of scientific workers. A chapter devoted to the methods devised by the geologist for the purpose of assessing the value of chemical analyses of rocks and minerals will be of special value to all who have to deal with such analyses.

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LABORATORY METHODS OF ORGANIC CHEMISTRY. By L. Gattermann. Revised by Heinrich Wieland. Translated from the 24th German Edition by W. McCartney. London: Macmillan and Co., Ltd. 435 pp. 18s.

While the student is being educated in preparative work it is necessary for him to acquire some knowledge of the incessant progress in the methods of organic chemistry, and at the same time to become familiar with the most recent results of research work. For these reasons a series of changes had to be made when this new edition was prepared. To avoid increasing the bulk of the book these objects have been attained by sacrificing examples (*e.g.* lino-lenic acid, crystal violet, Gattermann-Koch aldehyde synthesis) with which, from this point of view, it seemed possible to dispense. Among the the newly included methods are analysis by chromatographic adsorption (which has attained such great importance), and ozonisation of unsaturated compounds by the recently well-developed procedure. The section on analytical methods has been completely re-written because the development of organic chemistry has caused the macro-methods practised in the classic period—methods which required considerable amount of material—to come to be regarded as survivals.

* * *

PRINTING METALS. London: Fry's Metal Foundries, Ltd. 92 pp.

This book offers an outline of the metallurgy of printing metals and of the factors governing the choice of alloys for particular purposes. It goes on to consider the general principles of metal casting and the problems of casting type and stereo plates. Finally it offers advice on the care of printing metals during use. Much of this matter has been published before through the medium of the lectures given by members of the staff of Fry's Metal Foundries, Ltd., by articles in the trade papers, leaflets, etc., all of which has now been assembled to form what is possibly the most comprehensive text-book ever published on printing metals and their application.

* * *

BARIUM MINERALS. By J. Simpson. 2nd Edition. pp. 84. Imperial Institute. 2s.

As in other Imperial Institute reports, an account of the resources of the particular minerals forms the greater part of this book, each country being treated separately and accompanied by tables of trade statistics. In the shorter introductory section concise accounts are given of the mineralogy, milling and fine-grinding of the minerals, of the bleaching processes used for barytes, and a section is included on world-production and marketing. A selected bibliography of 12 pages is included.

SULPHURIC ACID MANUFACTURE. By Andrew M. Fairlie. New York: Reinhold Publishing Corporation. London: Chapman and Hall, Ltd. 669 pp. 48s. 6d.

The attempt has been made here to produce a book on sulphuric acid manufacture which would be of practical use to the chemical engineer, the technical chemist, the acid manufacturer (actual or potential), the student at college, and the acid consumer, without clogging the text with lengthy descriptions of obsolete processes or of mere proposals that have not been reduced to practice. One object has been to present up-to-date information, in readily accessible form, within the compass of a single volume, so that the work would be of a size adaptable for revision as frequently as advances in the industry may require, such revisions being within the efforts of all who wish to keep abreast of developments. In order to keep within the limits of a single volume, pertinent matter readily available elsewhere has been omitted, and the temptation to expand the treatment of various topics has been resisted. In all such cases copious references have been introduced.

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ABSORPTION AND EXTRACTION. By Thomas K. Sherwood. London: McGraw-Hill Publishing Co., Ltd. 278 pp. 21s.

This book may be divided roughly into three parts: the theoretical aspects of diffusion and the underlying theory of the design of absorption equipment, a summary of the available performance data on various types of equipment, and a section dealing with the basic principles of solvent extraction. The first presents the important relations derived from the kinetic theory and explains their applicability to the interphase transfer of materials. Graphical methods for design calculations are treated in detail, and a chapter is devoted to the design of absorption equipment for multicomponent systems, so important in the petroleum industry. The two chapters on absorption equipment include brief descriptions of the principal types, as well as the physical characteristics, allowable gas and liquor rates, and pressure-drop data for the more important packing materials. Absorption coefficients for the various systems have been collected from various sources and are summarised and presented in a single standard set of units. The final chapter deals with the underlying principles of solvent extraction, and explains the general methods of calculation employed both for three-component systems and for the solvent refining of lubricating oils.

* * *

KELLY'S DIRECTORY OF THE MERCHANTS, MANUFACTURERS AND SHIPPERS OF THE WORLD. Two vols. Kelly's Directories, Ltd. 64s.

As in former years the 1937 edition of this famous directory is published in two volumes. In Vol. 2 there is a comprehensive directory of all the wholesale and manufacturing trade of the British Isles; this occupies no less than 1,790 pages. The information is classified both alphabetically and by trades, and it is information which has been obtained as a result of many years activities, and an exhaustive annual revision carried out by experts in directory work. The remainder of Vol. 2 is devoted to the British Empire other than the British Isles, and here the names of agents, exporters, importers, wholesale merchants and manufacturers are arranged alphabetically by trades and towns under the various geographical divisions. In Vol. 1 will be found particulars for all the countries of the world other than the British Empire. Here, the information is arranged similarly to that in the Dominion and Colonial Section of Vol. 2, and the British exporter will find what he needs to know with regard to world markets and the firms overseas with whom he wishes to get into touch. This volume is an essential pointer to the path of expansion in export trade. It should not be overlooked that the directory, considered as a whole, occupies a unique position containing information which in its entirety cannot be obtained from any other source.

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Detection of Toxic Gases

Colorimetric Apparatus for Quantitative Estimation

THE examination of tanks and closed vessels is a matter of daily routine at artificial silk works, chemical works, coke oven and by-product plant, gas works, petroleum refining works and tar distillation works. The behaviour of white mice in an atmosphere suspected of toxicity (arising from gases other than carbon monoxide), however, has ceased to be a satisfactory criterion for the safety of industrial workers.

The development of chemical tests sufficiently sensitive to indicate the presence of toxic gases in dangerous concentrations has long engaged widespread chemical attention. A series of tests has been worked out during the past three years on behalf of the Association of British Chemical Manufacturers and the Factory Department of the Home Office to enable quantitative colorimetric estimations to be performed by means of a prepared test paper under carefully prescribed

Fig. 1.

Fig. 2.

conditions on a number (twelve) of the toxic gases most commonly encountered in industry. The tests were required to be capable of application by non-technical operatives and the apparatus to be as free from complexity as possible. To ensure their practical applicability the methods have been exhaustively tested at various stages during their elaboration by prominent chemical manufacturers in works in all parts of the country. The required conditions have now been met and the problem is approaching a complete solution. The gases dealt with are sulphuretted hydrogen, arseniuretted hydrogen, sulphur dioxide, nitrous fumes, organic halogen compounds, aniline, prussic acid, chlorine, carbon disulphide, carbon monoxide, phosgene, benzene, and nitrobenzene.

Sulphuretted Hydrogen Data

At present full data is available on sulphuretted hydrogen only, the determination of which is treated in No. 1 of the series of monographs which will be issued as the tests are described. The booklet (H.M. Stationery Office) will include a standard colour stain chart. Their publication marks an important contribution to the safety and health of industrial workers.

Two forms of apparatus are available, the fundamental part in each of which is the same, consisting of a cast aluminium test paper holder (A) divided into two parts which are separated by a rubber washer and clamped together by non-removable thumb screws. A prepared test paper can rapidly be inserted between the two sections by slackening the thumb screws. The test is applied by aspirating the suspected atmosphere at a predetermined rate through the test paper for a recorded time of such duration as to produce on the test paper a stain equal in depth to one of the standards provided on the colour chart. As an example, concentrations of carbon monoxide of 0.2 per cent. can be detected in less than 2 minutes, 0.05 per cent. in 6 minutes and 0.01 per cent. in half an hour.

The difference between the two forms of apparatus lies in the means provided for aspiration. In Fig. 1 there is a pump to the end of which the test paper holder is screwed. A recording counter (B) is mounted at the upper part and is operated by a flange attached to the piston rod. It registers the number of complete strokes of the piston and, therefore, by a simple calculation, the volume of air drawn through the test paper. In Fig. 2 the test paper holder is mounted in a rubber bung in the mouth of a 5-litre aspirator, the outlet of which is fitted with a glass tap and screw clip. A constant-head tube is provided. The inlet to the test paper holder is closed with a rubber bung fitted with an absorption tube which may be charged with activated charcoal to absorb gases likely to interfere with the colorimetric test.

Properties of Steam

A Compilation of Data

A CALORIMETRIC determination has been made by Drs. N. S. Osborne, H. F. Stimson, and D. C. Ginnings, of the thermal properties of saturated water, in both the liquid and gaseous states, from 100° C. (56 kg./sq. cm.) to the close vicinity of the critical point, 374° C. (225 kg./sq. cm.). This new determination supplements a previous determination in the same laboratory in the range from 0 to 270° C. With the new apparatus designed and built to withstand severe conditions of temperature and pressure, satisfactory measurements were possible up to within one degree of the critical point.

Special tests of the possibility of mixture of the liquid and vapour phases in evaporation experiments indicated freedom from this effect, except within one degree of the critical point. These tests included direct measurements of specific volume at 370° C., which confirmed the calorimetric results.

A compliation was made of the thermal properties of saturated water in the interval from 100 to 374° C., giving the vapour pressure and the specific volume, entropy, and enthalpy or heat content for both the liquid and gaseous states. This compilation is based on the results of the present measurements, supplemented by data covering the range from 100 to 270° C. from the previous investigation. This latter data is in accord with that of the present investigation at the same temperature. This work is reported in the "Journal of Research" (United States Bureau of Standards) for April, 1937, where comparisons between these values and certain groups of similar data from other laboratories are shown graphically.

United States Magnesium Industry

Notable Decrease in Output

PRODUCTION (sales) of primary magnesium in the United States during 1936 totalled 3,903,312 lb., a decrease of 8 per cent. compared with 1935. The Dow Chemical Co., Midland, Michigan, continued as the sole producer of the metal, which is derived by electrolysis of magnesium chloride obtained from brine. The 8 per cent. decline in magnesium output in 1936 was probably due to loss of foreign markets, recently an important factor, rather than decreased home consumption. Consumption of magnesium as a deoxidiser in the metallurgical industry and as a component in aluminium and other alloys probably continued at a high rate. Outstanding in 1936, however, was the increase made in its application as a material of construction in the form of high magnesium alloys.

Personal Notes

MR. H. R. WAKE, secretary of the Aluminium Co. of Canada, Ltd., has been elected chairman of the Montreal branch of the Canadian Manufacturers' Association; Mr. H. W. MATHESON, of Shawinigan Chemicals, Ltd., chairman of the Quebec branch.

DR. GUSTAV EGLOFF, director of research to the Universal Oil Products Co., Chicago, lectured to members of the South Wales branch of the Institution of Petroleum Technologists and kindred societies, at Swansea on June 9. His subject was "Synthesis in the Oil Industry."

MR. FRANK S. RUSSELL, chairman and managing director of General Refractories, Ltd., and the International Diatomite Co., Ltd., is on his way to the United States for a tour of the American works which produce refractories and diatomite insulating goods. He expects to return about the end of July.

PROFESSOR W. H. MERRETT is retiring from the Royal School of Mines, London, at the end of the current session. He has been associated with the metallurgical department of the school for nearly forty years, successively as instructor, lecturer and assistant professor, and has now reached the age limit.

MR. THOMAS RICHARD GRIMWOOD, a director of Enamelled Metal Products Corporation (1933), Ltd., died on June 10, age 76 years. The funeral service was held at St. Stephen's Church, St. Albans.

COLONEL NOEL HUDSON has been invited to join the board of the British Thermostat Co., Ltd., as chairman; Mr. F. G. POPLETT, the secretary of the company, has been elected to the board; Mr. J. E. SHERLOCK and Mr. W. F. F. MARTIN-HURST, two of the serving directors, have been appointed joint managing directors.

MR. THOMAS MABEN, a Fellow of the Chemical Society and of the Royal Society of Medicine, died at Herne Hill on June 9. Mr. Maben, who was 82 years of age, joined the staff of Parke, Davis and Co., in 1900, first acting as a representative in Scotland and subsequently (1904) being transferred to London to take charge of the medical and scientific department. He retired in 1930. He contributed regularly to the proceedings of the British Pharmaceutical Conference and was elected a member of the first B.P.C. Formulary Committee. He published some important papers dealing with alkaloidal standards for preparations of belladonna, colchicum, hyoscyamus, coca and gelsemium.

Chemical Notes from Foreign Sources

Czechoslovakia

THE PROPOSED COAL HYDROGENATION PLANT at Ostrau will cost 120 million kronen. No decision regarding the scheme has yet been reached.

Holland

METHYL ALCOHOL POISONING can be treated by intravenous injections of a 7.5 per cent. suspension of charcoal in physiological salt solution, according to A. Willehse, of the St. Joseph Hospital, Kerkrade.

Italy

A NEW METHOD OF PROCESSING HEMP FIBRES developed by Baron Gino Maltei is based upon destruction of the micro-organisms opposing the organisms of fermentation. It is claimed that better quality hemp fibre is obtained by this process (which has been successfully tried out in Campania) than by the customary methods.

Jugoslavia

EXPLOITATION OF PYRITES MINES at Sinjakovo is expected to commence in the near future.

RUBBER AND COTTON PLANTATIONS are to be established over an area of 3,000 hectares recently acquired in the Strumica region by the Bata concern. It is intended to establish factories in the vicinity to work up the raw materials.

Japan

PRODUCTION OF HYDROGEN PEROXIDE at the rate of 10,000 tons per annum is planned by the Osaka Soda Kaisha.

A NEW RUBBER PLANTATION COMPANY has been formed under the style of Showa Rubber Co. as a subsidiary of the Meiji Sugar Co.

SODIUM CYANIDE MANUFACTURE is to be undertaken by the Nippon Chisso Hiryo K.K. with a view to development of an export trade.

PRODUCTION OF CITRIC ACID by the Yukisan Kogyo K.K. is to be expanded to an annual production of 450 tons. The present Japanese consumption is only 250 tons so that a considerable surplus will be available for export to China and other countries.

Russia

PRODUCTION OF ABRASIVE WHEELS on a phenol-formaldehyde resin basin is to be started this year by the Smytczka Abrasives Factory at Lugo.

FLOWERS OF SULPHUR are being turned out on a semi-manufacturing scale, with low running costs, at the Czor-Ssu Mine of the Ssojus-Ssera Trust.

Germany

PRODUCTION OF THE SYNTHETIC RUBBER-LIKE PRODUCT, Thiokol, has been commenced in Saarau by a company formed under the ægis of the Rütgerswerke A.G. of Berlin and the Silesia Verein Chemischer Fabriker of Saarau.

Powder Factory Explosion

Three Men Killed

THREE men were killed and two were seriously injured when a series of explosions occurred at Nobels explosives factory at Ardeer, on the Ayrshire Coast, on Wednesday. The dead men are G. McCulley, of Sydney Street, Saltcoats; James Rainey, 30, of Canan Street, Saltcoats; and R. Niblock, of Kilwinning. The injured are James Paterson, 33, of Station Square, Stevenston, and James McNay, 32, of Hill Street, Ardrossan.

The first explosion occurred in one of the black powder magazines of the works, which are spread over several miles of the sand dunes on the Ayrshire Coast. Each of these magazines, in which the black powder used for blasting purposes is ground, is situated in a hollow of the sand dunes. Rainey and Niblock were working in the magazine in which this first explosion occurred. The burning débris thrown up by this explosion fell on three other magazines and caused them to explode also. The rescue squad of the factory was at once mobilised and a roll-call of the workers known to be engaged in the works was made.

When the explosions occurred there was considerable alarm in the villages of Ardeer, Stevenston, and Saltcoats, where two out of three residents are employed at the explosives factory. At first there was some fear that the whole of the works might be involved.

From Week to Week

BINDING CASES for THE CHEMICAL AGE can be obtained from the Publisher, Bouverie House, 154 Fleet Street, London, E.C.4, price 3s. 6d. each, post free, 4s.

THE NOMINAL CAPITAL of Associated P. A. Equipments, Ltd., has been increased by the addition of £1,000 in £1 "A" ordinary shares beyond the registered capital of £1,000.

THE PRINCIPLE OF PAID ANNUAL HOLIDAYS has been established for glass-bottle workers throughout Yorkshire. They will have a week's holiday with an allowance of £3 for craftsmen and the equivalent of a week's pay for day workers. About 10,000 employees will benefit.

THE BRITISH OXYGEN CO., LTD., has leased a site at Palmerston Road, Aberdeen, to be used for the supply of oxygen, dissolved acetylene, calcium carbide, fittings and accessories for oxy-acetylene cutting, and for the vaporising of oxygen sent to Aberdeen in liquid form.

THE INSTITUTE OF PHYSICS have made the following elections at a meeting held on June 9:—As Fellows: B. C. Laws, D.Sc. (Lond.), A.R.C.S., L. D. Mahajan, M.Sc. (Punjab), D. Narayanamurti, M.Sc. (Bombay), M. L. E. Oliphant, Ph.D., F.R.S., G. A. Whipple, M.A. (Cantab). As Associates: S. S. Dharmatti, M.Sc. (Bombay), A. J. Higgs, B.Sc. (Sydney), K. J. Milne, M.Ss. (Birm.), G. Ram, M.Sc. (Panjab), S. L. Seaton.

DUE TO THE INCREASING SALES of Burgess zeolite and Birm (Burgess iron removal mineral), it has been found necessary to manufacture these minerals in England, and the Burgess Zeolite Co., Ltd., has been formed for this purpose. It is hoped to be able to give deliveries of Burgess British-made freeze-formed zeolite and Burgess iron removal mineral by September next. The new factory is being equipped with the latest developments in controlled refrigeration to produce freeze-formed zeolite, which will be fully equal to, or even surpass, the high standard of the present Burgess zeolite.

NEGOTIATIONS FOR AN INTERNATIONAL COKE CONVENTION which have been in progress some time between representatives of coke producers in Germany, Holland, Belgium, Poland and the United Kingdom have been brought to a successful conclusion, and a convention has been signed in London by representatives of producers in the five countries named. A managing committee has been appointed to operate the convention. The chairman of the committee is Mr. Ralph Alsop, a director and assistant general manager of the Consett Iron Co., Ltd. A British Coke Export Sales Association has been formed to implement the undertaking of the exporters of the United Kingdom under the convention, and a National Central Committee has been appointed representative of various districts.

FOUR WORKMEN WERE FATALLY GASSED at Corby, near Kettering, on June 11, while at work on the erection of a new blastfurnace plant for Stewarts and Lloyds, Ltd. Ten others were affected when the gas escaped from a pipe while they were bricking-in a tube leading from the top of the blastfurnace into a soot catcher. All the men were employed by Bowen and Jackson, Ltd., contractors. The names of the victims are: Cyril Bellamy, of Naseby Road, Kettering; Harry Bailey Nottingham, of Woodville Place, Broadgate Lane, Horsforth, Leeds; John O'Hare and Patrick Jordan, both of Eldon Street, Oldham. Bellamy lost his life in an effort to save Nottingham, a bricklayer with whom he was working. Nottingham was wedged high up in a tube four feet in diameter leading from the blastfurnace into a soot catcher. To reach Nottingham, Bellamy had to climb nearly sixty feet up ladders inside the tube, which was being lined with firebricks. The two other victims, O'Hare and Jordan were working in another tube which led into the same blastfurnace.

THE SHIPPING RETURNS OF CHINA CLAY and china stone for the month of May are very satisfactory and not only show a substantial increase compared with the corresponding period of 1936, but indicate that the improvement set in since 1932 is being maintained. Though the shipments made in May were eleven thousand tons behind those recorded for April, they are ten thousand tons above the tonnage dealt with in May, 1936. The total volume of china clay delivered for the five months of the present year is 367,021 tons compared with 313,345 tons for the corresponding portion of last year, representing an increase of 53,676 tons. A most gratifying feature of the improving conditions is the recovery of the American market and the trade activity on the Continent despite the political upheaval. The details of the May shipments are as follows:—Fowey, 49,457 tons china clay; 4,618 tons china stone; 2,971 tons ball clay. Par, 9,629 tons china clay; 244 tons china stone; 154 tons ball clay. Charlestown, 7,397 tons china clay; 59 tons china stone. Padstow, 1,203 tons china clay. Newham, 146 tons china clay. Plymouth, 111 tons china clay. By rail, 5,532 tons china clay, making an aggregate tonnage of 81,521 tons, against 92,511 tons in April.

CYANAMID PRODUCTS, LTD., as from June 21, will have their offices at 14 Finsbury Circus, London, E.C.2. Telephone: Met. 2671 (unchanged) and 1865.

THE BUSINESS OF PAINT AND COLOUR MERCHANTS carried on by David Ker Laurie, under the name of Laurie and Co., at 32 Montrose Street, Glasgow, has been sold and will be carried on under the name of Laurie and Co., at 38 French Street, Glasgow, by James MacNeill and Sloan, Ltd.

SINTERING PLANT IS TO BE INSTALLED at the Normanby Park steelworks of John Lysaght, Ltd., Scunthorpe, at a cost of £100,000. It is to be ready by the end of this year and will have an annual output of 200,000 tons. Four blast furnaces are now operating at Normanby Park, but owing to the increased demand for steel a fifth furnace will be started up in August. This will be the first occasion for several years that all five furnaces have been working.

PLANS FOR THE NEW CHEMISTRY INSTITUTE to be erected at Glasgow University have been passed by Glasgow Dean of Guild Court. The Institute is to be erected at a cost of approximately £200,000 on the vacant site at University Avenue to the north of the zoology building. Plans provide for an administrative block with four units for the department of inorganic chemistry, organic chemistry, physical chemistry and medical chemistry, the whole forming a complete scheme. Each unit will be self-contained, but intercommunicating. Towards the cost of the new Institute the Carnegie Trustees for the Scottish Universities have made grants of £118,000.

PLANS TO UTILISE 775,000 TONS OF COAL per year are announced in the annual report of Low Temperature Carbonisation, Ltd. It is proposed to increase the present authorised capital of the company by £725,000 although it is not intended at the moment to issue the full amount of the increase. Smokeless fuel plant for dealing with 500 tons of coal a day is to be erected in South Wales at a cost of £650,000 by the company, the Government and the Nuffield Trust as a means of assisting the South Wales Special Area. The completion of the South Wales works will raise the number of smokeless fuel plants to five, and the yield from the coal used will be approximately 542,500 tons of smokeless fuel, and just over 16,000,000 gallons of liquid products, including petrol, Diesel oil, tar acids, creosote, fuel oil, pitch and other chemical derivatives.

New Companies Registered

Turner Mausden and Co., Ltd.—Manufacturers of chemical compounds, etc., 65 High Street, Staines, Middlesex. The nominal capital has been increased by the addition of £500 in £1 ordinary shares beyond the registered capital of £1,500.

Lindum Pharmacy, Ltd.—Registered June 14. Nominal capital £1,000. Consulting, analytical, manufacturing, pharmaceutical and general chemists, etc. Directors: Frank Wright, 18 St. Catherine, Lincoln; Mrs. Bertha M. Wright, Lionel D. Thorpe.

Medical Specifics, Ltd., 28 Lincolns Inn Fields, W.C.2.—Registered June 8. Nominal capital £100. Manufacturers of and dealers in chemicals, gases, drugs, medicines, etc. Subscribers: Sydney A. Pettifer, Robert H. E. Sloan.

Sussex Water Softeners, Ltd., 300a Ditchling Road, Brighton, Sussex.—Registered June 5. Nominal capital, £250. Manufacturers of and dealers in water softeners and domestic appliances and utensils of all kinds, etc. Directors: Thomas B. Jones, John S. Gowland, John Stafford Gowland.

Resplim, Ltd.—Registered June 1. Nominal capital, £100. Manufacturers and distillers of and dealers in perfumes and essences, soaps, salves, ointments, powders, toilette preparations, etc. Subscribers: Wm. P. Hammond, 12 Norfolk Street, W.C.2; Edwd. Versluys.

British Chlorophyll Company, Ltd.—Registered June 2. Nominal capital, £100. Manufacturers, producers, extractors, preparers, importers and exporters of chlorophyll and other substances and ingredients extracted from materials of a vegetable character. Directors: Wm. Parker, Babingley Hall, Kings Lynn, Norfolk; Henry Kunzer.

Rousselot Gelatine, Ltd.—Registered May 22. Nominal capital, £100. Manufacturers of and dealers in gelatine, glues, gum, adhesives, abrasive materials, paper, waterproofing, etc. Subscribers: Jean E. Bonchendhomme, 18 Wolverton Gardens, Ealing, W.5; Fernard M. Dupre.

Bush Stores (Chemists) Co., Ltd., 174, 43 and 45 Railway Approach, Shepherds Bush, W.12.—Registered June 4. Nominal capital, £550. Wholesale, retail, manufacturing and dispensing chemists, artists' colourmen, etc. Directors: Abraham I. Shimansky, Jacob Shimansky, Judah Shimansky, Myer Shimansky.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the London market for general heavy chemicals, pharmaceutical and photographic chemicals, perfumery chemicals, essential oils and intermediates. Unless otherwise stated, the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Except for renewed easiness which has developed in the lead, copper and other non-ferrous metal compounds in sympathy with the fall in the metals, quotations have maintained their steadiness in most sections of the chemical market at Manchester during the past week. There has been a fresh sprinkling of new contract business covering deliveries over the second half of the year and also a number of transactions for near delivery positions, whilst specifications against contracts are generally on a fair scale. Caustic soda and most of the other soda products are being taken up in fair quantities, and this is also the case with the potash and ammonium compounds. The heavy acids meet with a quietly steady demand. Among the by-products, also, contract deliveries are on steady lines although new business is only moderate. Firmness is particularly marked in carbolic and cresylic acids and pyridine.

GLASGOW.—There has been an improved demand for chemicals for home trade during the week, though export business still remains very quiet. Prices generally continue steady at about previous figures, but lead and zinc products are lower on account of the fall in the prices of the metals. There has been only a limited volume of fresh business put through in coal tar products since last report. Continued interest is centred on carbolic and cresylic acids, but while there is much discussion on tar acids in certain quarters, little fresh business has been concluded and buyers at the moment appear less inclined toward forward commitments. Middle oil and creosote remain very steady, with fair quantities moving in this district. An improvement is reported also in deliveries of washed oil which is rather more plentiful and has slackened in price ¼d. Pyridines continue firm; solvent naphthas are steady with the 90/190 heavy grade less readily obtained.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

ACID, CHROMIC.—9¼d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%, ex store.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 10s. to £55 per ton ex store.

ACID, SULPHURIC.—168° Tw., £4 5s. to £4 15s. per ton; 140° Tw., arsenic-free, £2 15s. to £3 5s.; 140° Tw., arsenious, £2 10s.

ACID, TARTARIC.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2¼d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £16 10s. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—£55 10s. per ton.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish, £17, ex store.

BARIUM CHLORIDE.—£10 per ton. GLASGOW: £11 5s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. GLASGOW: 70/75% solid, £5 10s. per ton net ex store.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. GLASGOW: 99%, £4 7s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LEAD ACETATE.—LONDON: White, £35 10s. per ton; brown, £35. GLASGOW: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36; brown, £35.

LEAD NITRATE.—£39 per ton.

LEAD, RED.—SCOTLAND: £38 per ton, less 2½%, carriage paid for 2-ton lots.

LEAD (WHITE SUGAR OF).—GLASGOW: £37 per ton net, ex store.

LITHARGE.—SCOTLAND: Ground, £37 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.) 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

PHENOL.—7¾d. to 8¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39 10s.

POTASSIUM BICHROMATE.—SCOTLAND: 5d. per lb., less 5%, carriage paid.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £38 per ton.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—£27 per ton. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 10¾d. to 1s.

POTASSIUM PRUSSATE.—6½d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6½d. to 6¾d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. GLASGOW: Large crystals, in casks, £38.

SALT CAKE.—Unground, spot, £3 16s. 6d. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £12 15s. per ton in 1 cwt. kegs, £11 per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. MANCHESTER: 4d. per lb. GLASGOW: 4d., less 5% carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£26 10s. to £30 per ton. GLASGOW: £1 10s. per cwt.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHATE.—Commercial, 2 ton lots d/d, £10 5s. per ton; photographic, £14 5s. MANCHESTER: Commercial, £10; photographic, £14 10s.

Sodium Metasilicate.—£14 per ton, d/d U.K. in cwt. bags.
Sodium Nitrate.—Refined, £7 15s. per ton for 6-ton lots d/d.
Sodium Nitrite.—£18 5s. per ton for ton lots.
Sodium Perborate.—10%, 9¼d. per lb. d/d in 1-cwt. drums.
Sodium Phosphate.—£13 per ton.
Sodium Prussiate.—4d. per lb. for ton lots. Glasgow: 5d. to 5¾d. ex store. Manchester: 4d. to 4½d.
Sodium Silicate.—£9 10s. per ton.
Sodium Sulphate (Glauber Salts).—£3 per ton d/d.
Sodium Sulphate (Salt Cake).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. Scotland: Ground quality, £3 5s. per ton d/d. Manchester: £3 10s.
Sodium Sulphide.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. Manchester: Concentrated solid, 60/62%, £11; commercial, £8.
Sodium Sulphite.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
Sulphate of Copper.—£20 per ton, less 2%, in casks. Manchester: £22 10s. per ton f.o.b. Scotland: £24 10s. per ton less 5%, Liverpool, in casks.
Sulphur Precip.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
Zinc Sulphate.—Crystals, £9 per ton, f.o.r., in bags.

Rubber Chemicals

Antimony Sulphide.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.
Arsenic Sulphide.—Yellow, 1s. 5d. to 1s. 7d. per lb.
Barytes.—£6 to £7 10s. per ton, according to quality
Cadmium Sulphide.—7s. 7d. to 8s. per lb.
Carbon Bisulphide.—£31 to £33 per ton, according to quantity, drums extra.
Carbon Black.—3 11/16d. to 4 13/16d. per lb., ex wharf.
Carbon Tetrachloride.—£41 to £46 per ton, according to quantity, drums extra.
Chromium Oxide.—Green, 1s. 2d. per lb.
Diphenylguanidine.—2s. 2d. per lb.
India-rubber Substitutes.—White, 4½d. to 5d. per lb.; dark, 3¾d. to 4¼d. per lb.
Lamp Black.—£22 to £23 per ton d/d London; vegetable black, £28 to £48.
Lead Hyposulphite.—9d. per lb.
Lithopone.—30%, £16 10s. to £17 5s. per ton.
Sulphur.—£9 to £9 5s. per ton. Sulphur precip. B.P., £55 to £60 per ton. Sulphur precip. comm., £50 to £55 per ton.
Sulphur Chloride.—5d. to 7d. per lb., according to quantity.
Vermilion.—Pale, or deep, 5s. 3d. per lb., 1-cwt. lots.
Zinc Sulphide.—10d. to 11d. per lb., according to quality.

Nitrogen Fertilisers

Sulphate of Ammonia.—Neutral quality, basis 20.6 per cent. nitrogen, delivered in 6-ton lots to farmer's nearest station, £7 5s. per ton.
Calcium Cyanamide.—£7 5s. per ton, carriage paid to any railway station in Great Britain in lots of four tons and over.
Nitro-Chalk.—£7 5s. per ton for delivery to end of June.
Nitrate of Soda.—£7 12s. 6d. per ton for delivery up to end of June.
Concentrated Complete Fertilisers.—£10 12s. to £11 1s. per ton delivered in 6-ton lots to farmer's nearest station.
Ammonium Phosphate Fertilisers.—£10 5s. to £13 15s. per ton for delivery up to end of June, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

Acid, Cresylic.—97/99%, 5s. 3d. to 5s. 5d. per gal.; 99/100%, 5s. to 6s., according to specification; pale 99%, 5s. 6d. to 5s. 8d.; dark, 4s. 8d. to 4s. 10d. Glasgow: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. 4d. to 2s. 8d. American specification, 4s. 3d. to 4s. 6d Manchester: Pale, 99/100%, 5s. 3d.
Acid, Carbolic.—Crystals, 7¾d. to 8½d. per lb.; crude, 60's, 4s. 3d. to 4s. 6d. per gal. Manchester: Crystals, 8½d. per lb. f.o.b. in drums; crude, 4s. per gal. Glasgow: Crude, 60's, 3s. 9d. to 4s. per gal.; distilled, 60's, 4s. 3d. to 4s. 6d.
Benzol.—At works, crude, 10d. to 10½d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d.; pure, 1s. 8½d. to 1s. 9d. Glasgow: Crude, 10d. to 10½d. per gal.; motor, 1s. 5d. to 1s. 5½d.
Creosote.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3¾d. d/d. London: 4½d. f.o.r. North: 5d. London. Manchester: 5½d. to 6½d. Glasgow: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sq. gr. oils, 5½d. to 5¾d.
Naphtha.—Solvent, 90/160%, 1s. 7d. to 1s. 8d. per gal.; 95/160%, 1s. 8d. to 1s. 9d.; 90/190%, 1s. 2d. to 1s. 3d. London: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. Glasgow: Crude, 6d. to 6¾d. per gal.; 90% 160, 1s. 6½d. to 1s. 7½d., 90% 190, 1s. 1d. to 1s. 2d.
Naphthalene.—Crude, whizzed or hot pressed, £10 10s. to £11 10s. per ton; purified crystals, £18 to £20 per ton in 2-cwt. bags. London: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. Glasgow: Fire lighter, crude, £6 to £7 per ton (bags free). Manchester: Refined, £22 per ton f.o.b.
Pyridine.—90/140%, 9s. to 9s. 6d. per gal.; 90/180, 2s. 9d. to 3s. 6d. Glasgow: 90% 140, 9s. to 10s. per gal.; 90% 160, 7s. to 8s.; 90% 180, 2s. 6d.
Toluole.—90%, 2s. 1d. per gal.; pure, 2s. 6d. to 2s. 7d. Glasgow: 90%, 120, 1s. 10d. to 1s. 11d. per gal.
Pitch.—Medium, soft, 36s. to 37s. per ton, in bulk at makers' works. Manchester: 35s. f.o.b., East Coast. Glasgow: f.o.b. Glasgow, 32s. to 37s. per ton; in bulk for home trade, 32s. 6d.
Xylol.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. Glasgow: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

Acetate of Lime.—Brown, £8 5s. to £8 15s. per ton; grey, £10 10s. to £11 10s. Liquor, brown, 30° Tw., 6d. to 8d. per gal. Manchester: Brown, £9 10s.; grey, £11 10s.
Charcoal.—£6 5s. to £12 per ton, according to grade and locality.
Methyl Acetone.—40-50%, £42 to £45 per ton.
Wood Creosote.—Unrefined 6d. to 1s. per gal., according to boiling range.
Wood, Naphtha, Miscible.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
Wood Tar.—£3 to £4 per ton.

Intermediates and Dyes

Acid, Benzoic, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.
Acid, Gamma.—Spot, 4s. per lb. 100% d/d buyer's works.
Acid, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
Acid Naphthionic.—1s. 8d. per lb.
Acid, Neville and Winther.—Spot, 3s. per lb. 100%.
Acid, Sulphanilic.—Spot, 8d. per lb. 100%, d/d buyer's works.
Aniline Oil.—Spot, 8d. per lb., drums extra, d/d buyer's works.
Aniline Salts.—Spot, 8d. per lb. d/d buyer's works, casks free.
Benzidine, HCl.—2s. 5d. per lb., 100% as base, in casks.
m-Cresol 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-Cresel 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-Cresol 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
Dichloraniline.—1s. 11½d. to 2s. 3d. per lb.
Dimethylaniline.—Spot, 1s. 6d. per lb., package extra.
Dinitrobenzene.—7½d. per lb.
Dinitrochlorbenzene, Solid.—£72 per ton.
Dinitrotoluene.—48/50° C., 8½d. per lb.; 66/68° C., 10d.
Diphenylamine.—Spot, 2s. per lb., d/d buyer's works.
α-Naphthol.—Spot, 2s. 4d. per lb., d/d buyer's works
β-Naphthol.—9½d. to 9¾d. per lb.; flake, 9½d. to 9¾d.
α-Naphthylamine.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.
β-Naphthylamine.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.
o-Nitraniline.—3s. 11d. per lb.
m-Nitraniline.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-Nitraniline.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.
Nitrobenzene.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
Nitronaphthalene.—9d. per lb.; P.G., 1s. 0½d. per lb.
Sodium Naphthionate.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.
o-Toluidine.—10½d. per lb., in 8/10-cwt. drums, drums extra.
p-Toluidine.—1s. 10½d. per lb., in casks.
m-Xylidine Acetate.—4s. 3d. per lb., 100%.

Latest Oil Prices

London, June 16.—Linseed Oil closed easier. Spot, £31 15s. (small quantities); July to April, £29 2s. 6d., naked. Soya Bean Oil was dull. Oriental (bulk), afloat. Rotterdam, £23 15s. Rape Oil was slow. Crude extracted, £36; ttchnical refined, £37, naked, ex wharf. Cotton Oil was quiet. Egyptian crude, £27 10s.; refined common edible, £30 15s.; deodorised, £32 15s., naked, ex mill (small lots £1 10s. extra). Turpentine was quiet. American, spot, 37s. 6d. per cwt.

Hull.—Linseed Oil, spot, quoted £29 15s. per ton; June, July-Aug., Sept.-Dec., and Jan.-April, £29 2s. 6d. Cotton Oil, Egyptian, crude, spot, £27 10s.; edible, refined, spot, £30 10s.; technical, spot, £30 10s.; deodorised, £32 10s., naked. Palm Kernel Oil, crude, f.m.q., spot, £26, naked. Groundnut Oil, extracted, spot, £32; deodorised, £35. Rape Oil, extracted, spot, £35; refined, £36. Soya Oil, extracted, spot, £31 10s.; deodorised, £34 10s. per ton. Cod Oil, f.o.r., or f.a.s., 27s. 6d. per cwt., in barrels. Castor Oil, pharmaceutical 44s.; first, 39s.; second, 37s. Turpentine, American, spot, 39s. 3d. per cwt.

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

MEANS FOR PRODUCING GAS FROM TAR, crude oils, and the like.—H. F. Walsham. Dec. 2, 1935. 6252/36.

SINTERED HARD METAL ALLOYS.—F. Krupp, A.-G. Dec. 2, 1935. 29801/36.

MANUFACTURE OF ALLOYS.—Hardy Metallurgical Co. Dec. 4, 1935. 32167/36.

METHOD OF MANUFACTURING RUBBER-LIKE MATERIALS.—Sumitomo Electric Wire & Cable Works, Ltd. Dec. 7, 1935. 32557/36.

MANUFACTURE OF MONOAZO DYESTUFFS.—I. G. Farbenindustrie. Dec. 2, 1935. 32660/36.

MANUFACTURE OF DYED FIBRES having a high lustre.—E. Elod. Dec. 2, 1935. 32971/36.

MANUFACTURE OF ADHESIVES.—H. Heine. Dec. 5, 1935. 33057/36.

METHOD OF FIREPROOFING INFLAMMABLE MATERIALS.—Ruhrchemie. Dec. 4, 1935. 33249/36.

PROCESS FOR THE MANUFACTURE OF COMPOUNDS OF THE ANDROSTANE and pregnane series.—Schering-Kahlbaum. Dec. 7, 1935. 33445/36.

TREATMENT OF COPALS, amber, and similar resins.—E. Asser, and T. Ruth (trading as Ruth Temperol-Werke Chemische und Lackfabriken, G.) Dec. 7, 1935. 33608/36.

TUBES AND LIKE ARTICLES OF SYNTHETIC RESIN.—J. C. Asch. Dec. 7, 1935. 35841/36.

Specifications Accepted with Date of Application

PRODUCTION OF PARAFFIN-WAX EMULSIONS.—E. E. Mayer. Oct. 12, 1935. 466,510.

MANUFACTURE AND PRODUCTION OF HEAVY OILS poor in, or free from, asphalt.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 20, 1936. 466,524.

COLOURING COMPOSITIONS.—British Celanese, Ltd. Feb. 9, 1935. 466,298.

HYDRAULIC CEMENT.—Dewey and Almy, Ltd. (Dewey and Almy Chemical Co.). Feb. 12, 1936. 466,229.

MANUFACTURE OF DYES.—Kodak, Ltd. (Eastman Kodak Co.). Aug. 15, 1935. 466,244.

MANUFACTURE OF CARBOCYANINE DYES.—Kodak, Ltd. (Eastman Kodak Co.). Aug. 15, 1935. 466,245.

METHODS OF AND APPARATUS FOR PLATING METALS AND ALLOYS.—U. Raydt. Nov. 12, 1936. 466,401.

RECOVERY OF VALUABLE ORGANIC PRODUCTS, in particular liquid products, from solid carbonaceous substances by pressure-extraction.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 8, 1936. 466,336.

PROTECTIVE GLASS CONTAINING NEODYMIUM.—Degea, A.-G. (Auerges.). May 25, 1936. 466,262.

PROCESS FOR THE MANUFACTURE OF AMIDE DERIVATIVES of isoxazole carboxylic acids.—F. Hoffman-La Roche and Co. March 20, 1936. 466,555.

MANUFACTURE AND PRODUCTION OF NITROGENOUS PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 22, 1935. 466,344.

MANUFACTURE OF INTERMEDIATES FOR DYES.—Kodak, Ltd. (Eastman Kodak Co.). Aug. 15, 1935. 466,268.

PRODUCTION OF POLYVINYL RESINS.—H. E. Potts (Shawinigan Chemicals, Ltd.). Sept. 26, 1935. 466,598.

PROCESS FOR COLOURING ACETATE ARTIFICIAL SILK.—C. Shaw, P. G. Carter, R. H. Sennett, and Imperial Chemical Industries, Ltd. Oct. 30, 1935. 466,601.

DYEINGS.—W. W. Groves (I. G. Farbenindustrie.) Oct. 31, 1935. 466,772.

ELECTROLYTIC PROCESS FOR THE HYDROGENATION OF CARBONACEOUS MATERIAL.—W. Thomas, and E. L. Davies. Nov. 1, 1935. 466,708.

PROCESS FOR PRODUCING DYEINGS and printings.—I. G. Farbenindustrie. 466,846.

MANUFACTURE AND PRODUCTION OF DYESTUFFS of the anthraquinone series.—G. W. Johnson (I. G. Farbenindustrie.) Nov. 30, 1935. 466,714.

MANUFACTURE OF SULPHURIC ACID.—Imperial Chemical Industries, Ltd. Nov. 30, 1934. 466,721.

MANUFACTURE AND PRODUCTION OF CAPILLARY-ACTIVE CARBOXYLIC ACID AMIDES.—G. W. Johnson (I. G. Farbenindustrie.) Dec. 4, 1935. 466,853.

PRODUCTION OF AMMONIUM NITRATE in granular form.—E. I. du Pont de Nemours and Co. Jan. 10, 1935. 466,795.

MANUFACTURE OF GLASS.—T. F. Pearson. Dec. 5, 1935. 466,797.

MANUFACTURE OF MONOAZO DYESTUFFS.—A. H. Knight and Imperial Chemical Industries, Ltd. Dec. 5, 1935. 466,799.

APPARATUS FOR THE SURFACE-HARDENING OF METAL ARTICLES.—I. G. Farbenindustrie. Dec. 29, 1934. 466,812.

PROCESS FOR THE MANUFACTURE OF ORGANIC MERCURY-SILICON COMPOUNDS.—I. G. Farbenindustrie. Dec. 6, 1934. 466,813.

PROCESS FOR THE MANUFACTURE OF SALTS OF CONDENSATION PRODUCTS.—I. G. Farbenindustrie. Dec. 6, 1934. 466,814.

TREATMENT OF CELLULOSIC MATERIAL.—R. J. W. Reynolds, E. E. Walker, C. S. Woolvin, and Imperial Chemical Industries, Ltd. Dec. 6, 1935. 466,817.

MANUFACTURE AND PRODUCTION OF ALDEHYDES.—G. W. Johnson (I. G. Farbenindustrie.) Dec. 18, 1935. 466,723.

DE-ASHPHALTING AND DEWAXING OF HYDROCARBON OILS.—E. Petty, and M. B. Cooke. Feb. 21, 1935. 466,731.

TREATMENT OF TEXTILES.—I. G. Farbenindustrie. June 6, 1935. 466,734.

PROCESS FOR PRODUCING A MIXTURE OF CARBON MONOXIDE and hydrogen suitable for the synthesis of hydrocarbons.—H. Koppers' Industrieele Maatschappij N.V. July 3, 1935. 466,737.

MANUFACTURE OF WATER-SOLUBLE DERIVATIVES of the indole series.—J. R. Geigy. May 14, 1936. 466,635.

APPARATUS FOR REFINING PAPER-PULP STOCK.—Cowles Co. July 5, 1935. 466,689.

MANUFACTURE OF INDIGOID DYESTUFFS.—Soc. of Chemical Industry in Basle. July 10, 1935. 466,638.

MANUFACTURE OF PHENOL-ALDEHYDE CONDENSATION PRODUCTS.—Ajinomoto Honpo Kabushiki Kaisha Suzuki Shoten. Oct. 12, 1935. 466,741.

PROCESS FOR DRYING ARTIFICIAL TUBULAR PRODUCTS produced from animal fibrous material.—Naturin Ges. Oct. 15, 1935. 466,743.

PROCESS FOR THE MANUFACTURE OF ALKYL DERIVATIVES of aminated aromatic hydrocarbons.—U.S. Industrial Alcohol Co. Oct. 22, 1935. 466,650.

Applications for Patents

MANUFACTURE OF COMPOSITE METAL ARTICLES.—Northern Aluminium Co., Ltd., and T. H. Mayes. 14068.

PISTONS.—Northern Aluminium Co., Ltd. 14376.

PROCESS FOR TREATING PAPER.—T. L. Osborne. 14424.

MANUFACTURE OF MAGNESIUM OXIDE and calcium carbonate.—H. Pauling. 14096.

PREPARATION OF PIGMENTS CONTAINING ZINC OXIDE.—C. W. Price, and L. H. Jordan. 14505.

DEWAXING CATALYSTS.—Robinson Bindley Processes, Ltd. 14158.

CATALYTIC SYNTHESIS OF HYDROCARBON OILS.—Robinson Bindley Processes, Ltd. 14159.

MANUFACTURE OF LUMINOUS MATERIALS.—Schering-Kahlbaum. (Germany, May 28, '36.) 14391.

DECOLOURISING, ETC., OF CALCIUM PHOSPHATES.—J. Schindelmeiser. 14655.

MANUFACTURE OF CARBOXYLIC ACID ESTERS of aromatic sulphodicarboxylic acids.—Soc. of Chemical Industry in Basle. (Switzerland, May 23, '36.) 14379.

MANUFACTURE OF AMINOARYL SULPHONES.—Soc. of Chemical Industry in Basle. (Switzerland, May 26, '36.) 14612.

MANUFACTURE OF ALCOHOLS from olefines.—Standard Alcohol Co. (United States, Aug. 12, '36.) 14061.

PROCESS FOR OBTAINING VALUABLE POLYMERS from hydrocarbon gases.—Standard Oil Development Co. (United States, June 27, '36.) 14163.

MANUFACTURE OF ALCOHOL-REPELLENT COMPOSITIONS.—E. C. de Stubner. 14270.

PROCESSING PIGMENT DISPERSIONS.—E. C. de Stubner. 14271.

MAGNETIC ALLOYS.—I. D. Taverner. 14614.

PROCESSES FOR THE PRODUCTION OF CONCENTRATED SOLUTIONS OF SODIUM OR POTASSIUM BISULPHITE.—Tomaszowska Fabryka Sztucznego Jedwabiu Spolka Akcyjna, S. Poznanski and A. Bovyniec. 14160.

PROCESS FOR THE SEPARATION, ETC., OF METALS or metal compounds.—W. H. Vale. (Australia, May 29, '36.) 14234.

WATER-SOLUBLE ORGANIC IODINE COMPOUNDS.—Winthrop Chemical Co., Inc. (United States, May 29, '36.) 14390.

AZO DYESTUFFS FOR LEATHER.—H. Ackroyd. 14973.

FEEDING PLASTIC MATERIALS SUCH AS DOUGH.—Baker Perkins, Ltd. (Nov. 2, '35.) 14913.

TREATMENT OF RUBBER.—Belvedere Chemical Co., Ltd., and W. E. Messer. 15060.

MANUFACTURE OF BASIC ESTERS OF POLYARYLACETIC ACIDS.—A. G. Bloxam. (Switzerland, June 8, '36.) 14860.

PLASTIC COMPOSITIONS.—A. E. Bond. 14782.

PROTECTION OF METALS AGAINST EROSION.—Bristol Aeroplane Co., Ltd. 14764.

DEVICE FOR DESULPHURISING OF COMBUSTIBLE GASES.—Carbonisation et Charbons Actifs. (France, March 11.) 15312.

MANUFACTURE OF VAT DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) 14969.

MANUFACTURE OF 4-HYDROXY-1-AMINONAPHTHALENE-8-CARBOXYLIC ACID and of 4-hydroxynaphtho-styril.—A. Carpmael (I. G. Farbenindustrie.) 15348.

MANUFACTURE OF ORGANIC SUBSTANCES.—H. Dreyfus. 14960.

MANUFACTURE OF VAT DYESTUFFS of the anthraquinone-acridone series.—A. Carpmael (I. G. Farbenindustrie.) 15257.

TREATMENT OF CARBONACEOUS MATERIALS.—H. Dreyfus. (July 23, '36.) 14961.

MANUFACTURE OF ORGANIC SUBSTANCES.—H. Dreyfus. (Feb. 3.) 14962.

RUBBER-COATED SHEET MATERIALS.—E. I. du Pont de Nemours and Co., and R. Morgan. 15211.

NITRATION OF POLYVINYL ALCOHOL.—E. I. du Pont de Nemours and Co. 15212.

MANUFACTURE OF AZO DYESTUFFS.—Durand and Huguenin, A.-G. (Germany, May 28, '36.) 14857.

MANUFACTURE OF CERAMIC MATERIALS.—Erdle and Prange, Inc. (United States, Sept. 21, '36.) 15116.

MANUFACTURE OF COLOURED PHOTOGRAPHIC MATERIALS.—B. Gaspar. (Germany, May 30, '36.) 15051.

HYDRATING CAMPHENE.—W. W. Groves (I. G. Farbenindustrie.) 14734.

MANUFACTURE OF ARTIFICIAL SUBSTANCES.—W. W. Groves (I. G. Farbenindustrie.) 14741.

MANUFACTURE OF W-CHLOROMETHYL-L-NITRONAPHTHALENE.—W. W. Groves (I. G. Farbenindustrie.) 15078.

MANUFACTURE OF TRIPHENYLMETHANE DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) 15079.

WATERPROOFING TEXTILE MATERIALS.—W. W. Groves (I. G. Farbenindustrie.) 15320.

HIGH EXPLOSIVES.—C. S. Hallett. 14878.

PRODUCTION OF SILICON IRON.—Heraeus-Vacuumschmelze, A.-G. (Germany, June 27, '36.) 14747.

WATERPROOFING TEXTILE FIBRES, fabrics, etc.—E. B. Higgins. 14843.

COLOURING, ETC., OF TEXTILES and other tissues.—E. B. Higgins. 14882.

MANUFACTURE OF PLASTIC MASSES FROM POLYVINYL CHLORIDE.—I. G. Farbenindustrie. (Germany, May 27, '36.) 14736.

PROCESS FOR IMPROVING ARTIFICIAL-SILK FABRICS.—I. G. Farbenindustrie. (Germany, June 13, '36.) 14737.

PRODUCTION OF LAYERS OF THERMOPLASTIC highly viscous products.—I. G. Farbenindustrie. (Germany, May 28, '36.) 14856.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. (Germany, July 2, '36.) 14859.

PRODUCTION OF HIGHLY POLYMERIC COMPOUNDS.—I. G. Farbenindustrie. (Germany, June 16, '36.) 15205.

MANUFACTURE OF ACID GREEN TRIPHENYLMETHANE DYESTUFFS.—I. G. Farbenindustrie. 15326.

MANUFACTURE OF ACID TRIPHENYLMETHANE DYESTUFFS.—I. G. Farbenindustrie. 15327.

RECOVERY OF AROMATIC HYDROCARBONS.—I. G. Farbenindustrie. 15333.

MANUFACTURE OF FLUORO-SULPHONIC ACID.—I. G. Farbenindustrie. (Germany, June 11, '36.) 15349.

CHEMICAL MANUFACTURE.—Mathieson Alkali Works. (United States, July 13, '36.) 14886.

MANUFACTURE OF GLYCOLS and their derivatives.—E. Neumann, and E. J. Lush. 14880.

MANUFACTURE OF PYRIMIDINE THIAZOLIUM COMPOUNDS.—Research Corporation. (United States, June 15, '36.) 15270.

TREATMENT OF TEXTILE MATERIALS with rubber.—Rubber Producers' Research Association, B. H. Wilsdon, C. M. Blow and Wool Industries Research Association. 14712.

PROCESS FOR CONVERSION OF HYDROCARBON OILS.—Universal Oil Products Co. (Jan. 4, '36.) (United States, June 24, '35.) 14756.

CONCENTRATION OF CHROMIUM ORES.—G. F. Alexander. (Union of South Africa, June 25, '36.) 15740.

SURFACE-TREATMENT OF METALLIC ARTICLES, particularly aluminium.—Aluminium Laboratories, Ltd. (Switzerland, June 17, '36.) 15735.

ROT-PROOFING, ETC., TEXTILE MATERIALS.—S. G. Barker and National Processes, Ltd. 15964.

MANUFACTURE OF ORGANIC SUBSTANCES.—British Celanese, Ltd. (United States, June 5, '36.) 15640.

PROCESS FOR DYEING CELLULOSE, ETC.—A. Carpmael (I. G. Farbenindustrie.) 15468.

MANUFACTURE OF PIGMENT DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) 15469.

MANUFACTURE OF PREPARATIONS CONTAINING HORMONE CALLICREIN. A. Carpmael (I. G. Farbenindustrie.) 15566.

MANUFACTURE OF WATER-INSOLUBLE AZO-DYESTUFFS in substance or on fibre.—A. Carpmael (I. G. Farbenindustrie.) 15568.

MANUFACTURE OF ZINC PIGMENTS.—A. Carpmael (I. G. Farbenindustrie.) 16006.

TREATMENTO OF TEXTILE FIBRES.—A. Carpmael (I. G. Farbenindustrie.) 16007.

TREATMENT OF RAW MINERAL MATERIALS.—C. E. Every-Clayton (F. L. Smith and Co. Aktieselskab.) 15595.

DISTILLATION OF HIGH-BOILING LIQUIDS.—Colgate-Palmolive-Peet Co. (United States, June 11, '36.) 15784.

MANUFACTURE OF 4:4'DINITRODIPHENYLSULPHIDE.—T. Dewing. 15389.

MANUFACTURE OF ACRYLOXY CARBOXYLIC ACIDS and their esters. E. I. du Pont de Nemours and Co. (United States, June 5, '36.) 15779.

SEPARATION OF PARAFFIN from paraffin-containing hydrocarbon mixtures.—Edeleanu-Ges. (United States, June 8, '36.) 15883.

REFINING OF HYDROCARBON OILS.—Edeleanu-Ges. (United States, June 8, '36.) 15885.

CHROMIUM-MANGANESE STEEL.—Electro Metallurgical Co. (United States, June 11, '36.) 15933.

CHROMIUM-MANGANESE-NICKEL STEEL.—Electro Metallurgical Co. (United States, June 11, '36.) 15934.

STEELS.—Electro Metallurgical Co. (United States, June 24, '36.) 15935.

CORROSION-RESISTANT STEELS.—Electro Metallurgical Co. (United States, June 11, '36.) 15936.

CORROSION-RESISTANT STEELS.—Electro Metallurgical Co. (United States, June 11, '36.) (Cognate with 15936.) 15937.

Chemical and Allied Stocks and Shares

THE stock and share markets have shown a reactionary trend and prices have moved against holders despite the removal of uncertainty as to the details of the new profits tax.

Shares of chemical and kindred companies reflected the general tendency, but apart from the usually active shares which invariably move rather closely with market conditions, prices have been fairly well maintained on balance. Distillers are 114s. 6d. at the time of writing, compared with 115s. 6d. a week ago, but were bought on any reaction, the hopes attaching to the forthcoming results having maintained interest in the shares. Turner and Newall declined further and are 89s. 4½d. compared with 93s. 1½d. a week ago. Nevertheless many market men are of the opinion that an increase in the dividend from 17½ per cent. to 20 per cent. is not unlikely despite the absence of a larger interim payment. British Oxygen, Murex and Metal Box were other prominent shares to move sharply against holders. The market is continuing to anticipate that the impending results of the last-named company will show a larger dividend. Associated Portland Cement were lower at 90s. as were British Plaster Board at 38s. 6d. If, as is still being hoped, the dividend on the 5s. shares of the last-named company were again brought up to 50 per cent. the shares would give a large yield at around their current price. Tunnel Portland Cement and most other cement shares were lower.

Imperial Chemical are 37s. at the time of writing, or the same as a week ago. Salt Union have improved from 54s. to 54s. 9d. as a result of the recent announcement that holders of the stipulated 90 per cent. of both the preference and ordinary stock of the Salt Union have accepted the exchange into preference and ordinary stock of Imperial Chemical Industries. Rumours have been current this week of developments in the salt industry which may make for a lessening of competition and higher prices, but they lack confirmation.

Unilever were affected by general market conditions and have lost 1s. to 41s. 3d., while Lever Brothers' preference did not keep best prices and British Oil and Cake Mills preferred shares lost their improvement of the previous week. It is generally assumed that later in the year proposals for simplifying the structure of the Unilever group will be brought forward. It may be recalled that reference to this was made at the last meeting of Unilever.

Sangers were relatively steady at 26s. 6d., aided by the maintenance of the dividend at 25 per cent. and the company's capital proposals. Boots Pure Drug were steady around 51s. and Timothy Whites and Taylors were also little changed on balance. Wall Paper Manufacturers deferred shares were good, there having been a further improvement in price from 42s. to 42s. 9d. at the time of writing. Barry and Staines Linoleum were 7½d. down at 45s. Micheal Nairn and Greenwich kept at 70s., aided by confident expectations that the interim dividend will be unchanged.

Triplex Safety Glass have declined from 68s. to 65s. 7½d., but this is attributed to general market conditions which have affected many active shares. Lancegaye Safety Glass failed to respond to the large increase in profits and dividend, while Forster's Glass remained steady on the full report.

Richard Thomas have improved moderately on balance, aided by the good impression created by the preliminary statement and the raising of the dividend to 15 per cent. A larger capital will rank for dividend this year and the meeting is awaited in the market with a good deal of interest for any reference to prospects. Consett Iron were fairly steadya; the full results indicate that fully 20 per cent. was earned on the ordinary capital last year, so that the 7½ per cent. dividend represents a very conservative treatment of profits.

Oil shares failed to respond to the large rise in profits shown by the "Shell" report.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

INDUSTRIAL COLLOIDS, LTD., Altrincham. (M., 19/6/37.) June 4, mortgage to Martins Bank, Ltd., securing all moneys due or to become due to the Bank; charged on all moneys payable or to become payable to company by virtue of a certain licence and an agreement. *Nil. Nov. 30, 1936.

K. BEUGGER AND CO., LTD., Gillingham (Kent), chemical manufacturers. (M., 19/6/37.) June 4, £275 debenture to H. C. Darley and others, Chatham; general charge. *——. Jan 15, 1937.

Satisfactions

LEVER BROTHERS, LTD., Port Sunlight, soap manufacturers. (M.S., 19/6/37.) Satisfactions June 8, of debenture stock registered May 4, 1932, to extent of £68,800, and of debenture stock registered November 1, 1932, and April 10, 1933, to extent of £45,763.

FREDERICK BRABY AND CO., LTD., London, N.W., galvanised steel manufacturers. (M.S., 19/6/37.) Satisfactions June 8, of 1st and 2nd debentures registered November 16, 1906, and amount outstanding July 1, 1908.

Companies Winding-up Voluntarily

R. ABRAHAMS (CHEMISTS), LTD. (C.W.U.V., 19/6/37.) Creditors' claims by July 18 to Samuel Classick, of 3 Norfolk Street in the city of Manchester, certified accountant, the liquidator of the company.

Companies Winding-Up

PLIMSOLINE PRODUCTS, LTD. (C.W.U., 19/6/37.) Statutory meetings at 29 Russell Square, London, W.C.1, June 24, 1937, creditors at 12 noon; and contributories at 12.15 p.m.

Company News

English Clays Lovering Pochin and Co.—An interim of 1½ per cent., less tax (against 1 per cent.) is announced on the ordinary shares.

Cellon.—Payment of dividend for half-year ended June 30, 1937, on 6 per cent. preference is announced. Warrants will be posted on June 30.

British Oxygen Co.—A dividend of 3¼ per cent. for the half-year ending June 30, 1937, will be paid to holders of 6½ per cent. preference stock registered at close of business on June 11. Warrants will be posted on June 29.

Sangers.—A final dividend of 16¼ per cent., making 25 per cent. for the year to March 31, 1937, is recommended. A similar distribution was made in the previous year. It is proposed to make an issue of one 5s. ordinary share at 10s. for every 10 shares held to shareholders registered on July 2. The new shares will participate in profits as from April 1, 1937.

Vitamins.—The report for the year ended March 31, 1937, shows a net profit of £28,017 (£23,948); to tax, £7,055; interest paid on November 30, 1936, on 6 per cent. income debenture stock (less tax), for period April 1 to November 30, 1936, £2,107; add balance brought forward, £795, making £19,650; to general reserve, £5,300. Ordinary dividend 20 per cent, less tax (10 per cent.), takes £11,760, leaving forward, £2,679.

Anglo-Alpha Cement.—A first dividend of 5 per cent. (9d. per share) payable on June 30, has been declared. The company, formerly the Anglovaal Portland Cement Co., Ltd., which is registered in Johannesburg, has an issued capital of £790,000 in 5s. shares. It was formed in 1934 and is a merger of Anglovaal Portland Cement and Atlas Cement of South Africa, whose works at Henneman have just started operations.

British Sugar Corporation.—A dividend of 4 per cent., less tax, is to be paid for the year ended March 31, 1937. The annual meeting will be held on June 29 at the Waldorf Hotel at 11 a.m. The Corporation was registered in June, 1936, to take over, under the Sugar Industry (Reorganisation) Act, as from April 1, 1936, the eighteen beet sugar factories of the fifteen British beet sugar companies operating at that date. The authorised capital is £5,000,000 in £1 shares.

Apex (Trinidad) Oilfields.—An interim dividend of 12½ per cent. (7½d. per share), less tax at 2s. 6.9d. in the £, is announced in respect of the year ending September 30, 1937, payable on July 16, to shareholders registered on June 19. This compares with 10 per cent. in the previous year when the final dividend was 25 per cent.

Standard Chemical Co.—The report for the year to March 31 last shows gross earnings $88,754.36 ($58,463.50). After providing $17,500.00 for depreciation and $10,594.50 reserve for income-tax, there remains net profit of $60,659.86 (against $35,963.50). In view of improvement in financial position of company, directors have deemed it advisable to eliminate as at April 1, 1937, remaining deficit standing on books, amounting to $35,031.97, by reducing capital value of no par value shares of company by corresponding amount. Shareholders are being asked to confirm this action at annual meeting in Toronto on July 29.

Low Temperature Carbonisation.—Profits for the five months ended March 31 last, after interest, taxation, and depreciation, were £37,402, and £11,998 was brought in. A dividend of 4 per cent. is recommended for the period, being at the rate of 9.6 per cent. per annum, leaving £11,150 to go forward. The profit for the year to October 31, 1936, was £61,233, and a dividend of 6 per cent. was paid. It has been decided to alter the accounting period to the end of March, which is the end of the winter fuel season, and a convenient date for making up accounts, so that the annual meeting may in future be held in June. The authorised capital is to be increased from £1,275,000 to £2,000,000, although there is no intention of issuing at present anything like the full amount of the authorised increase.

Lancegaye Safety Glass.—A jump of £41,178 to £46,067 in net profits is shown in the accounts to March 31, 1937. This year's profit includes £11,598 received from the company's subsidiary which earned a net profit of £15,769. The company is increasing its dividend from 6 per cent. to 20 per cent. and is also paying a bonus of 4 per cent. As 14 per cent. has already been paid in interims, the final will be 10 per cent. and will be payable on a larger capital. Reserves have been strengthened, general reserve receiving £6,000, investment reserve £1,000 and bad debts reserve £2,000. After placing £1,500 to staff fund there will remain £3,219 to go forward, against £411 brought in.

Bleachers' Association.—A considerable increase in profits is announced in the report for the year ended March 31, 1937. After charging £157,811, against £150,961, to maintenance and repairs, trading profit was £320,748, compared with £280,051 in the previous year, an increase of £40,697. The 1935-36 figure, however, included £9,896 profit on sale of investments. After fees, debenture interest and allowing a further £140,000 for depreciation, the net profit was £77,149, against £36,452, or £26,556, if allowance is made for the special credit mentioned above. For the first time since 1934 a dividend is to be paid on the preference capital. This class of stock receives 2¾ per cent. actual, bringing the dividend up to December 31, 1933. This payment will leave £183,411 to go forward, compared with £174,669 brought in. There is £2,487,500 of 5½ per cent. preference stock and £3,818,737 of ordinary stock in issue. The balance sheet shows that the general reserve is unchanged at £923,609. Fixed assets appear at £7,417,447, against £7,525,063, shares in subsidiaries at £1,348,658, against £1,337,711, and advances to subsidiaries at £820,695, compared with £803,829. Stocks are slightly lower at £40,438. Cash has increased from £112,873 to £158,785, and investments from £554,952 to £607,800. Meeting, Blackfriars House, Manchester, June 25, at 12 noon.

Forthcoming Events

LONDON.

June 24.—Mineralogical Society. General meeting. Burlington House, Piccadilly, London.

June 25.—Physical Society. Ordinary scientific meeting. Imperial College of Science and Technology, Imperial Institute Road, South Kensington, London.

NEWCASTLE-UPON-TYNE.

June 19.—North of England Institute of Mining and Mechanical Engineers. General meeting. Lecture Theatre of the Institute, Newcastle-upon-Tyne.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—H.M. Trade Commissioner at Calcutta reports that the Indian Stores Department is calling for tenders (Tender No. M.336) for the supply and delivery as and when required during the period November 1, 1937-October 31, 1938, of quantities of creosote from coal tar for treating soft wood sleepers. Forms of tender (fee 5s.) are obtainable from The Director-General, India Stores Department, Belvedere Road, London, S.E.1.